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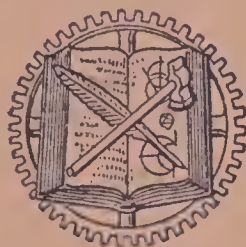
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195

VALENCE

effected. It is represented thus, the dotted lines indicating the partial valence,

$$R-C \equiv CH-CH=C-R$$

Cf. conjugated double bonds.

Valence, Potential. Residual af-
 finity.

Valence, Primary. See valence,
 chief.

Valence, Secondary. See valence,
 auxiliary.

Valence, Supplementary. See val-
 ence, auxiliary.

Valency. 1. Valence. 2. The
 numerical value of the valence. 3. The
 symbols used to represent valence.

Valency Electrons. (Valency cor-
 puscles. Mobile electrons.) Mobile
 electrons which are assumed to form a
 bond between atoms enabling atoms
 to hold to one another in combinations.

Valency Isomerism. Isomerism due
 to difference in linkage of primary and
 auxiliary valencies.

Valency, Sleeping. See valence,
 free.

Valency Volume. A quantity num-
 erically equal to the sum of the valences
 of the atoms contained in a molecule.

Vanadic. Compounds of vanadium
 in which that metal is trivalent, as
 VCl_3 .

Vanadous. (Vanadous.) Com-
 pounds of vanadium in which that
 metal is divalent, as VCl_2 .

Vanadium. Metallic element. V.
 At. Wt. 51.0. S. G. 6.025. S. heat
 0.1240. M. P. 1680°. Valence 2, 3,
 and 4. Ore, vanadinite. Oxides,
 V_2O_3 , V_2O_4 , V_2O_5 . The
 higher oxides exhibit acidic properties.

Vanadous. Vanadous.

Vanadyl. The trivalent radical VO,
 as in vanadyl chloride, $VOCl_2$.

Vapor. A gas. Sometimes the
 term is restricted to those gases which
 may be easily condensed or which
 exist as liquids or solids at ordinary
 temperatures.

Vapor Bath. A steam bath.

Vapor Density. The density of a
 gas referred to hydrogen as unity.
 If hydrogen is taken as 2 the vapor
 density is approximately the molecular
 weight, if it is taken as one the vapor
 density equals half the molecular
 weight.

Vaporimeter. An instrument used
 to determine the vapor tension of a
 substance, particularly that of alco-
 holic liquids, whereby their content
 of alcohol may be estimated.

Vaporization, Heat of. (L.) (Lat-
 ent heat of vaporization, heat of
 evaporation.) The amount of heat
 in calories required to convert one
 gram of a substance into its vapor
 without temperature change. The
 amount of heat required varies with
 the temperature at which the evapora-
 tion is carried on, decreasing as the
 temperature increases, thus for water,

t.	L.
0.	596.3 cal.
25.	582.5
75.	553.3
100.	538.0

The heat of vaporization of a solid is
 termed its heat of sublimation.

Vaporization, Molecular Heat of.
 (A.) (Molecular heat of evaporation.)
 The heat of vaporization of one-gram
 molecule of any substance, numerically
 equal to the product of the heat of
 vaporization and the gram-molecular

PSEUDO-

atalysis. (Catalysis by
 cyclic action.) A type
 of action in which one of the
 reagents appears among
 the products unchanged although it
 takes part in the reaction (dis-
 tinguished from true catalysis).

o-Celluloses. (Reserve cellu-
 lose.) Hemicelluloses.
 do-Isomerism. A term applied
 to isomerism, dyn-

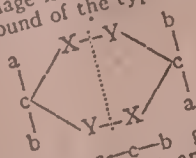
automerism. Tautomerism. See
 isomerism, dynamic.

seudomorphism. A phenomenon
 which a substance exhibits an
 normal crystalline form. Sub-
 stances which show this are termed
 pseudomorphous.

Pseudomorphous. See pseudo-
 morphism.

Pseudo-Solutions. Solutions which
 do not obey the usual physical laws
 applying to solutions, as the law of
 osmotic pressure, raising of the boiling
 point, and lowering of the freezing
 point. Colloidal solutions are often
 spoken of as pseudo-solutions.

Pseudo-Symmetry. (Compound
 symmetry, indirect symmetry.) 1.
 The condition of certain inactive indi-
 visible types of asymmetric compounds
 which contain two structurally similar
 asymmetric carbon atoms and are
 without a plane of symmetry yet whose
 reflected image is identical with them,
 as a compound of the type.



in which the a-c-b groups are
 assumed to be at right angles to the
 plane of the ring. One-half of the
 compound must be rotated through

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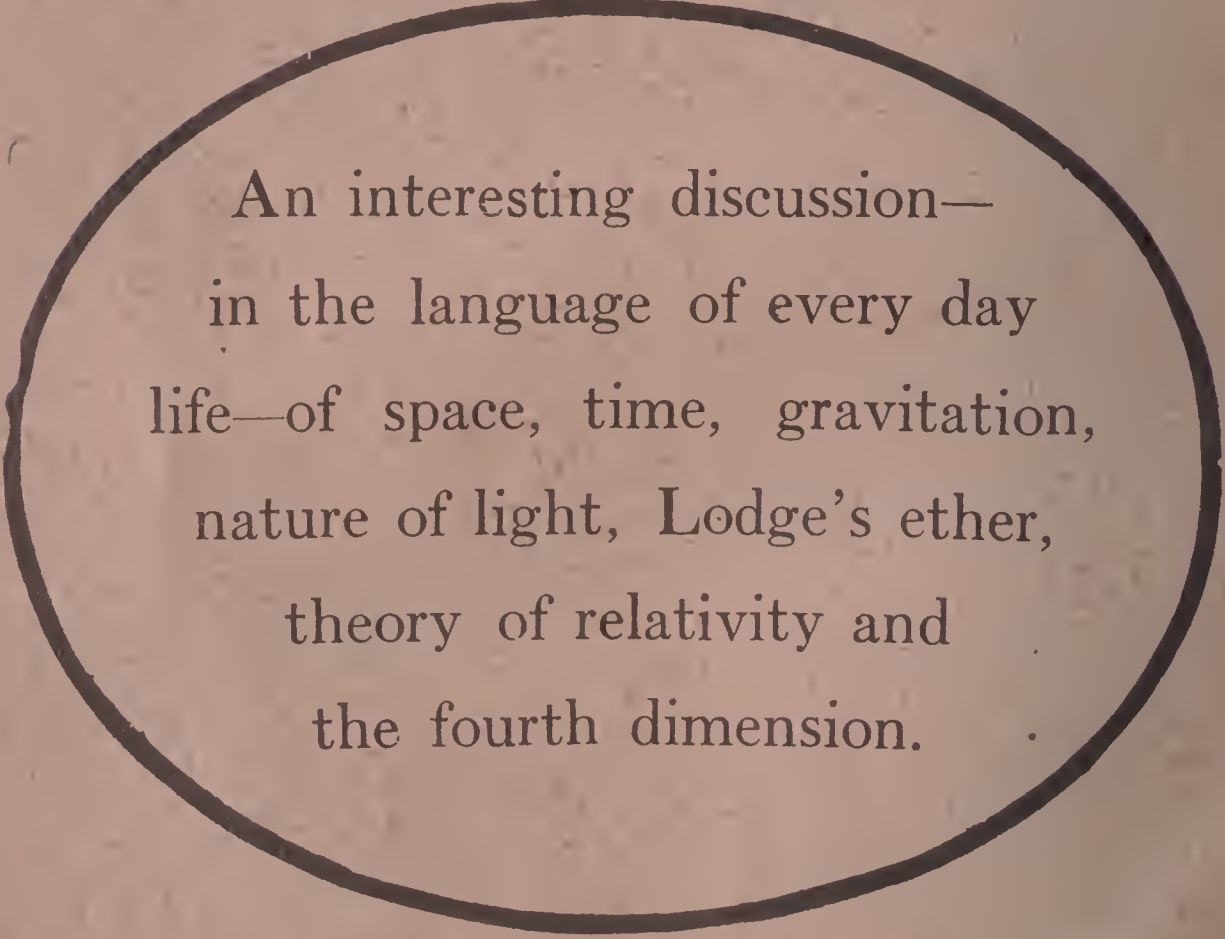
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CONTENTS: List of the Elements; Hydrogen Gas; Chlorine, Bromine, Iodine, Fluorine, and Their Compounds with Hydrogen; Hydrochloric Acid Gas; Acids, Bases and Salts; Hydrobromic, Hydriodic and Hydrofluoric Acid; Atoms and Their Weights; Calculating Formula from the Results of Analyses; Molecules and Their Weights; Oxygen; Sulphur; Sulphuric Acid; Acid Salts; Double Salts; Basic Salts; Nitrogen; Nitric Acid; Aqua Regia; Explosives; Phosphorus; Various Modifications of Certain Elements; Ozone; Phosphoretted Hydrogen; Building up of Plants from Inorganic Substances; Arsenic; Antimony; Carbon; Organic Chemistry; Valencies of the Elements; Chemistry of Organized Substances; Asymmetric Carbon Atom; Manufacture of Coal-Gas; Acetylene Gas; Petroleum; Flame; Silicon; The Metals; The Light Metals; Preparation of the Light Metals by Electricity; Potassium; Sodium; Calcium; Magnesium; Aluminum; The Systematic Arrangements of the Elements.

LETTS, E. A. *Some Fundamental Problems in Chemistry: Old and New.* 44 ill., 6 x 9, 250 pp. **\$2.00**

CONTENTS: *The Older Chemistry.* Ancient Theories Regarding the Nature of Matter and More Recent Theories as to the Nature of Energy; The Atomic Theory and Atomic Weights; The Periodic Law. *The Newer Chemistry.* The Effects of Electrical Discharges on Gases in High Vacua; Radioactivity; The Question of Inorganic Evolution; Lockyer's Views and Works; The Birth and Death of Worlds; Gravitation and Radiation Pressures; Arrhenius' Views; Continuation of Collie and Patterson's Researches on the Presence of Neon in Hydrogen After the Passage of the Electric Discharge Through the Latter at Low Pressures.

MARTIN, GEOFFREY. *Triumphs and Wonders of Modern Chemistry.* A popular treatise on modern chemistry and its marvels, written in non-technical language for general readers and students. 76 ills., 6 x 8¼, 378 pp. **\$3.00**

CONTENTS: The Mystery of Matter. The Underworld of Atoms. Distribution and Evolution of the Elements. The Wonders of Chemical Change. Water The Element Hydrogen. The Air. Oxygen, The Life Supporting Element. The Element Nitrogen. The Element Carbon. Carbon Dioxide. Silicon and its Com-

pounds. Sulphur and its Compounds. The Phosphorous Group of Elements. Fire, Flame and Spectral Analysis.

The author, who is a lecturer in chemistry at the University of London, deals with a variety of subjects in a very interesting manner, covering the whole field of the sciences that are correlated with chemistry or that have any phenomena connected with them that can be explained by chemical reasoning.

MARTIN, GEOFFREY. *Modern Chemistry and Its Wonders.* A popular account of some of the more remarkable recent advances in chemical science. 65 ill., $5\frac{1}{4} \times 7\frac{3}{4}$, 267 pp. **\$3.00**

CONTENTS: The Wonderland of Modern Chemistry; The Romance of Some Simple Nitrogen Compounds; The Romance of Explosives; Radium and the New Chemistry; The Mystery of the Periodic Law; The Radio-elements and the Periodic Law; Modern Alchemy; Applications of Electricity to Chemistry; The Romance of Hydrocarbons; The Romance of Sugar; The Romance of Alcohol; The Romance of Common Salt; Metallic Firestones; Artificial Precious Stones. The really wonderful achievements of modern scientific chemistry are popularly explained in this work. The author avoids, as far as possible, all technicalities so that the general reader who is at all familiar with the fundamentals of chemistry may grasp fully the wonders wrought by the chemical manipulation of the processes employed in the manufacture of common objects.

NORTH, H. B. *Laboratory Experiments in General Chemistry.* *Second Edition, Revised.* 36 ill., $5\frac{1}{2} \times 7\frac{3}{4}$, 212 pp. **\$1.00**

(Author is professor of chemistry in Rutgers College.)

CONTENTS: Causes of Chemical Change; Hydrogen; Oxygen and Ozone; Water and Hydrogen Peroxide; The Halogens; Acids, Bases and Salts; Nitrogen; Oxidation and Reduction; Sulphur; Carbon; Silicon and Boron; Phosphorus, Arsenic, Antimony and Bismuth; The Alkalies and Ammonium; The Alkaline Earths; Magnesium, Zinc, Cadmium and Mercury; Copper, Silver and Gold; Tin and Lead; Aluminum and Chromium; Manganese; Iron, Cobalt and Nickel; Platinum; Appendix; Correction of Gas Volumes; Chemical Arithmetic; Tables.

A manual of five hundred carefully chosen experiments on the most common elements, designed to cover a laboratory course in general chemistry given in connection with a series of experimental lectures and arranged so that it can be used with any good text book.

PERKIN, F. M., and JAGGERS, E. M. *Textbook of Elementary Chemistry.* 77 ill., $4\frac{3}{4} \times 7$, 342 pp. **\$1.00**

CONTENTS: Introduction; Examination of Water; Metric System; Distillation; Thermometers; Freezing, Boiling and Melting Points; The Atmosphere; Chemical Properties of the Atmosphere; Chemical Properties of Water; Hydrogen and Oxygen; Quantitative Examination of Chalk; Carbon and Its Oxides and Compounds with Hydrogen; Flame and Combustion; Compounds of Nitrogen; Hydrochloric Acid and the Halogens; Sulphur and Its Compounds; Phosphorous and Phosphorous Compounds; The Metals.

A simple course, leading from fact to fact, in an interesting and logical sequence intended to arouse in the student or reader a keen interest in the subject. The making of careful notes of all laboratory work during the progress of the study is greatly encouraged.

PILCHER, RICHARD B. *The Profession of Chemistry.* $5 \times 7\frac{1}{2}$, 215 pp. *In Press*

CONTENTS: Introduction; Preliminary Education; Pharmacists and Chemists; Professional Training; Prospects and Conditions of Practice; Professional Organizations; Public Analysts and Official Agricultural Analysts; Professional Procedure; Industrial Chemistry; Chemistry and the State; Teaching to the State; Women in Professional Chemistry; Chemistry in War.

PILCHER, RICHARD B., and JONES, FRANK B. What Industry Owes to Chemical Science. With an introduction by Sir George Beilby. 5 x 7½, 150 pp. \$1.50

CONTENTS: Minerals and Metals; Heavy Chemicals and Alkali; Coal and Coal Gas; Dyes, Explosives and Cellulose; Oils, Fats and Waxes; Leather; Rubber; Mortar and Cement; Refractory Materials; Glass and Enamels; Pottery and Porcelain; Chemical Products; Photography; Agriculture and Food; Brewing; Alcohol, Wines and Spirits; Tobacco, Inks, Pencils, etc.; Gases; Government Chemistry.

WADMORE, J. M. Elementary Chemical Theory. Ill., 5 x 7½, 286 pp. \$1.50

CONTENTS: Introduction. Gravimetric Laws of Chemical Reaction. Atomic Hypothesis. Law of Reacting Gas Volumes. Avogadro's Hypothesis. Vapor Densities. Molecular Weights. Selection of Atomic Weights. Dulong and Petit's Law. Crystalline Shape. Isomorphism. Periodic Law. Constitution of the Elements. Radioactivity. Formulæ and Equations. Constitution and Configuration of Compounds. Gas Laws and Kinetic Hypothesis. Critical Temperature and Liquefaction of Gases. Properties of Pure Liquids. Solutions. Freezing and Boiling Points of Solutions. Molecular Weights of Dissolved Substances. Liquid Diffusion. Osmotic Pressure. Electrolysis. Ionization. Degree of Ionization. Equilibrium of Electrolytes. Conclusion. Table of Atomic Weights.

WILSON, F. J., and HEILBRON, I. M. Chemical Theory and Calculations. An elementary textbook. Ill., 3 folding plates, 5 x 7¼, 145 pp. \$1.25

(Authors are lecturers in chemistry in the Royal Technical College, Glasgow.)

CONTENTS: The Metric System. Density and Specific Gravity. Thermometry. The Gas Laws. Solubility of Gases in Liquids. The Atomic Theory. Formulæ and Equations. Calculation of Percentage Composition of a Compound from its Formula. Calculation of Empirical Formula from Percentage Composition. Equivalents or Combining Weights. Atomic Weights. Valency. Periodical Classification of the Elements. Law of Mass Action. Determination of Vapor Densities. Osmotic Pressure and Molecular Weight Determination. Dissociation of Gases. Electrolytic Dissociation. Diffusion of Gases. Quantitative Analysis. Thermochemistry.

INORGANIC CHEMISTRY

CAVEN, R. M., and LANDER, G. D. Systematic Inorganic Chemistry. A textbook for advanced students. 6 x 8¾, 350 pp. \$2.25

After an introductory chapter on the atomic and molecular theories and valency, an account of the periodic law is given, followed by an examination of the successive groups so as to show the variation of properties in accordance with the provisions of the law; in the description of the groups, the elements and their analogous compounds are dealt with comparatively for the purpose of illustrating the manner of variation. The latest available material has been utilized, and brief accounts are given in appendices of the no-valency elements of the helium group, of views on the origin of elements, and of radioactivity.

DARLING, ELTON R. Inorganic Chemical Synonyms and Other Chemical Data. 4½ x 7¼, 109 pp. \$1.00

CONTENTS: Introduction; The Elements; Specific Gravity and Temperature Comparison; Standards of Weights and Measures; Chemical Synonyms: Aluminum; Antimony; Arsenic; Barium; Bismuth; Cadmium; Calcium; Chromium; Cobalt; Copper; Iron; Lead (Plumbum); Magnesium; Manganese; Mercury (Hydrargyrum); Nickel; Potassium; Silver; Sodium; Zinc; Miscellaneous Synonyms; Hydrogen Compounds; Cross Index of Chemical Terms.

SEETER, GEORGE. *A Text-Book of Inorganic Chemistry. Fourth Edition.*
90 ill., 5 x 7½, 631 pp. \$3.00

CONTENTS: Illustrations of Chemical Change; Conservation of Mass and Energy; Chemical Attraction; The Chemical Elements; Hydrogen; General Properties of Gases; Oxygen; Combustion; Water; General Properties of Liquids; Solution; Chlorine and Hydrochloric Acid; Laws of Chemical Combination; The Atomic Theory; Determination of Atomic Weights; Combining Weights and Chemical Equivalents; Formulae and Equations; Valency; Ozone and Hydrogen Peroxide; Thermochemistry; The Halogen and Halogen Acids; Chemical Equilibrium; Thermal Dissociation; Oxides and Oxygen Acids of the Halogens; Osmotic Pressure and Molecular Weight in Solution; Nitrogen, the Atmosphere and the Elements of the Helium Group; Compounds of Nitrogen with Hydrogen and with the Halogens; Oxydes and Oxyacids of Nitrogen; Phosphorus; Electrolysis and Electrolytic Dissociation; Sulphur, Selenium and Tellurium; Carbon; Combustion and Flame; Silicon and Boron; Classification of the Elements; The Periodic System; General Properties of the Metals and Their Compounds; The Alkali Metals; Metals of the Copper Group, Alkaline Earths, of the Zinc, Aluminum, Tin, Arsenic, Chromium, Manganese, Iron and Platinum Groups; Radio-Activity.

SILVERMAN, ALEXANDER, and HARVEY, A. W. *Laboratory Directions and Study Questions in Inorganic Chemistry.* Ill., 8 x 10½, loose leaf, 110 pp. \$2.00

The directions in this manual have been selected as representative not only of the practical applications of chemistry, but as illustrating modern theories. Wherever possible the apparatus required has been simplified so as to avoid the necessity of having the student use elaborate forms. The directions are arranged in loose leaf form so that they may be detached and submitted from day to day with results obtained in the laboratory. The study questions which form the second part of the book follow closely the treatment of Inorganic Chemistry in the college texts. Recitations may be conducted on the basis of the study sheets, thus obtaining uniformity in all quiz sections. This makes it impossible for the student to feel that he has failed in the course because of the method of quizzing of the instructor being different from that of the professor conducting the course, especially if final examinations are based on the study questions.

ORGANIC CHEMISTRY

BARROWCLIFF, M., and CARR, F. H. *Organic Medicinal Chemicals.*
5½ x 8¾. (Industrial Chemistry Series.) *In Press*

BERNTHSEN, A. A. *Textbook of Organic Chemistry.* Edited and revised to date by J. J. Sudborough. Ill., 5¼ x 7½, 735 pp. \$3.50

CONTENTS: ALIPHATIC OR OPEN-CHAIN COMPOUNDS. Hydrocarbons. Haloid Substitution Products of the Hydrocarbons. Monohydratic Alcohols or Alkyl Hydroxides. Derivations of the Alcohols. Aldehydes and Ketones. Monobasic Fatty Acids. Acid Derivatives. Polyhydric Alcohols. Hydroxy Monobasic Acids and Compounds Related to Them. Diabasic Acids. Polybasic Acids. Cyanogen Compounds. Carbonic Acid Derivatives. Carbohydrates. Chemistry of the Cyclic Compounds. CARBOCYCLIC COMPOUNDS. Polymethylene Derivatives. Benzene Derivatives. Benzene Hydrocarbons. Halogen Derivatives. Nitro-Substitution Products of the Aromatic Hydrocarbons. Amino-Derivatives or Arylamines. Diazo- and Azo-Compounds. Hydrazines. Aromatic Sulphonic Acids. Phenols. Aromatic Alcohols, Aldehydes, and Ketones. Aromatic Acids. Compounds Containing Two or More Benzene Nuclei. Diphenyl Group. Diphenyl-Methane Group. Dibenzyl Group. Triphenyl-Methane Group. Compounds with Condensed Benzene Nuclei. Anthracene and Phenanthrene Groups. HETEROCYCLIC COMPOUNDS. Furane Group. Compounds Formed by the Condensation of a Benzene Nucleus with a Furane, Triophene, or Pyrrole Ring. Pyrazole Group. Six-Membered Heterocyclic Rings,

Quinoline and Acridine Groups. Six-Membered Heterocyclic Compounds with Four Carbon Atoms in Ring. Alkaloids. Terpenes and Camphors. Resins. Glucosides. Albumins. Physiological Chemistry. Reduction. Oxidation. Stereochemistry of Sulphur, Selenium, Tin, and Nitrogen Compounds. Relationships between Physical Properties and Chemical Constitution. Fermentation and Enzyme Action. Catalytic Action of Finely-Divided Metals and Metallic Oxides. Unsaturation. Aliphatic Diazo- and Triazo-Compounds.

The present edition is on much the same lines as the former ones, but contains two entirely new chapters while a large number of others have been rewritten so as to bring them into accord with the problems that have been brought forth in recent years.

FISCHER, EMIL. Introduction to the Preparation of Organic Compounds.

Translated, with the author's sanction, from the *New (Eighth)* German edition by R. V. Stanford. 10 ill., 5 x 7½, 194 pp. **\$1.50**

CONTENTS: Part I. Nitrobenzene. Aniline. Acetanilide. Thiocarbonilide. Phenyl Mustard-oil. β -Phenylhydroxylamine. Nitrosobenzene. Ethyl Benzoate. *meta*-Brombenzoic Acid. Benzoyl Chloride. Benzamide. Diazobenzene Nitrate. Diazoamidobenzene. Amidoazobenzene. Sulphanilic Acid. Diazobenzenesulphonic Acid. Helianthin. Phenyl-hydrazine. Benzonitrile. Monoethylaniline. Nitrosodi-methylaniline. Hydrazobenzene and Benzidine. Ethyl Iodide. Aldehyde and Aldehyde-ammonia. Ethylene Bromide. Glycol. Methylamine. Benzyl Chloride. Benzaldehyde. Benzyl Alcohol. Benzoin. Benzil. Benzoic Acid. Cinnamic Acid. Hydrocinnamic Acid. Hexahydrobenzene. Acetoacetic Ester. Diacetosuccinic Ester. Diethyl Malonate. Benzylmalonic Ester. Benzylmalonic Acid. Terephthalic Acid. Pyruvic Acid. Epichlorhydrin. Acrolein. *ortho*- and *para*-Nitrophenol. Picric Acid. Anisole. Quinone and Hydroquinone. Salicylic Aldehyde. β -Naphthalene Sulphonic Acid. β -Naphthol. Naphthalene from Naphthol (distillation with zinc-dust). Potassium Cyanate and Urea. Alloxan and Alloxatine. Quinoline. Hydrocollidine and Collidine-dicarboxylic Esters. α -Methylindol (Methylketol). Diphenyl. Benzoyl-acetone. Benzophenone. Benzophenone oxime. Phenanthrene-quinone. Triphenylmethane. Triphenyl-carbinol. Malachite-green. Fluorescein and Eosin. Anthraquinone. Alizarine. Camphor-oxime. Part II. Furfural. Grape-sugar. Mannose. Gluconic Acid. Phenylhydrazide of Gluconic Acid. Saccharic Acid. Mucic Acid. α -Glucoheptonic Acid. α -Glucoheptose. Dulcitor. α -Methyl-glucoside. Glucosamine Hydrochloride. Leucine. Phenylalanine. Tyrosine. Cystine. β -Naphthalene-sulphoglycine. Glycocoll-ester and Glycine-anhydride. Leucyl-glycine. *d*-Alanine and Glycocoll-esterhydrochloride. Approximate Concentration of Reagents.

The preparation of 90 compounds are shown, and these have been selected because of their practical nature, such as the cost of materials and apparatus, the easiness, shortness and freedom from danger of the operations.

LOWY, ALEXANDER. Organic Type Formulas. Two color chart. 5 x 8. paper leaflet. **\$0.10**

Two charts, one for the aliphatic series and one for the aromatic series, which will be found useful to supplement the ordinary textbook on organic chemistry. Printed in two colors, to emphasize certain endings, type groups, etc., red lettering is used to advantage.

NEAVE, G. B., and HEILBRON, I. M. The Identification of Organic Compounds. 5 x 7½, 111 pp. **\$1.50**

CONTENTS: Preliminary Tests. Tests for the Elements. Group Reactions. Hydrocarbons. Alcohols. Ethers. Phenols. Aldehydes. Ketones. Acids. Aromatic Sulphonic Acids. Acid Anhydrides. Acid Halides. Acid Amides. Acid Imides. Acid Anilides. Esters. Quinones. Carbohydrates. Glucosides. Amines. Nitro Compounds. Nitroso Compounds. Nitriles and Isonitriles. Isocyanates. Ureas and Ureides. Uric Acid Group. Halogen Compounds. Azo Compounds. Pyridine and Quinoline Group. Alkaloids. Sulphur Compounds. Terpenes and Allied Compounds. Albumens and Proteids. Appendix.

Brings together in convenient form the principal reactions and physical constants of the most important organic substances. The aim is to eliminate guess-work on the part of the student and to provide methods by which the more important groups in the compound may be detected, the compound assigned to its class and completely identified by reference to the section dealing with the class to which it belongs.

POPE, F. G. *Modern Research in Organic Chemistry.* 261 diagrams, $5\frac{1}{4} \times 7\frac{1}{2}$, 336 pp. \$2.50

CONTENTS: The Polymethylenes. The Terpenes and Camphors. The Uric Acid and Purine Group. The Alkaloids. The Relation between the Color and Constitution of Chemical Compounds. Salt Formation. Pseudo-acids and Baess. The Pyrones. Ketens, Ozonides, Triphenylmethyl. The Grignard Reaction.

REID, E. EMMET. *Introduction to Research in Organic Chemistry.*

In Press

(Author is Professor of Organic Chemistry in Johns Hopkins University.)

CONTENTS: Introduction; Definition of Research and General Point of View; Literature; How to Find What Has Been Done on a Subject, etc.; The Study of Properties of Known Substances as an Object of Research; Study of Methods of Preparation of Known Substances as an Object of Research; Preparation of New Compounds; Study of Structures; Methods of Determination; Synthesis; Study of Reactions; Limits, Velocities; Intermediate Compounds; Study of Quantitative Methods for Estimation of Organic Compounds; Publication of Results.

SABATIER, PAUL. *Catalysis in Organic Chemistry.* Translated from the French by Prof. E. Emmet Reid. *In Press*

SCUDDER, HEYWARD. *Electrical Conductivity and Ionization Constants of Organic Compounds.* 6 x 9, 575 pp. \$3.00

Presents a bibliography of all the measurements of the ionization constants and the electrical conductivity of organic compounds that have appeared in the periodical literature between 1889 and 1910, inclusive, together with the values of the ionization constants and certain values of the electrical conductivity measurements, including also qualitative work. The work is divided into a set of tables arranged according to the names of compounds, containing all the data that may be given, with a bibliography of all of the references to each compound; a formula index to the compounds; a bibliography arranged according to names of authors; a subject index to certain subjects, and a journal list giving the names of all journals examined with the number and date of the last volume examined.

SUDBOROUGH, J. J., and JAMES, J. C. *Practical Organic Chemistry.* 92 ill., $5 \times 7\frac{1}{2}$, 394 pp. \$2.50

CONTENTS: Common Methods of Purification. Methods of Testing Purity. Solubility of Solids in Liquids. Detection of the Common Elements which Occur in Carbon Compounds. Estimation of Commonly Occurring Elements. Determination of the Equivalent of an Acid and of a Base. Determination of Molecular Weights by Physical Methods. Hydrocarbons. Alcohol and Ethers. Halogen Derivatives. Carboxylic Acids. Derivatives of Acids. Non-derivatives. Nitration. Sulphonic Acid. Sulphonation. Phenols and Phenolic Ethers. Amines and Quarternary Ammonium Compounds. Acetyl and Benzol Derivatives. Diazonium Salts and their Uses. Aldehydes and Ketones. Oximes, Phenyl-hydrazones and Semi-carbazones. Quinones. Claisen's Condensation. Ethyl Aceton Acetate. Its Reactions and Condensations. Ethyl Malonate and its Use as a Synthetical Reagent. Reduction. Oxidation. Condensation. Grignard's Reagents. Dyes. Iodine Compounds containing a Polyvalent Iodine Atom. Stereoisomeric Acids. Molecular Rearrangement. Quantitative Experiments with Acids, Esters, Amines, etc. Velocities of Typical Organic Reactions. Electrical Conductivity. Examination of Unknown Organic Substances. Preparation of Inorganic Reagents. Tables.

TITHERLEY, A. W. Laboratory Course of Organic Chemistry, including Qualitative Organic Analysis. Ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 240 pp. \$2.00

CONTENTS: Solubility; Filtration; Separation; Recrystallization; Melting Point; Boiling Point; Preparation and Purification of Organic Compounds; Hydrocarbons; Halogen Derivatives; Alcohols and Phenols; Aldehydes; Ketones and Quinones; Acids; Esters; Glycerides; Carbohydrates; Sulphur Compounds; Amines; Diazo-derivatives; Nitrites; Hetrocyclic Bases; Amides; Ureides; Alkaloids; Determination of Carbon; Hydrogen; Nitrogen; Phosphorus; Sulphur and Halogens in Organic Substances; Investigation of Organic Compounds; Characteristic Qualities of the Main Classes; Tables.

WALKER, JAMES. Organic Chemistry for Students of Medicine. 22 ill., 6×9 , 340 pp. \$3.00

The time allotted in the ordinary medical curriculum is usually very short, yet the student, when he takes up physiology, pharmacology and pathology, is expected to possess a knowledge not only of the principles of chemistry, but of numerous substances and processes, many of them very complex. In this book the chemical substances considered in the course are selected not so much for their importance in systematic or synthetic chemistry as for their medical interest, in order that the student study the things that will be of some utility to him in the later portions of his professional education. The work will be found a useful reference volume for the physician.

PHYSICAL CHEMISTRY

FIRTH, JAMES B. Practical Physical Chemistry. 74 ill., $5 \times 7\frac{1}{4}$, 190 pp. \$1.25

(Author is assistant lecturer and demonstrator in chemistry at Armstrong College, Newcastle-on-Tyne.)

CONTENTS: Introduction; Thermostats; Density of Gases, Liquids and Vapors; Determination of Viscosity and Surface Tension; Determination of Solubility; Determination of Molecular Weights; Determination of Transition Points; Osmotic Pressure; Refractivity Measurements; Rotation of the Plane of Polarization; Spectrum Analysis; Determination of Partition Coefficients; Thermo-Chemical Measurements; Determination of Transport Numbers; Electrical Conductivity; Electromotive Force; Velocity of Chemical Reaction; Quantitative Electrolytic Determinations; Electrolytic Preparations; Preparation of Colloids. Provides an interesting and well graded course of experimental lessons in the various branches of its subject, supplemented by as much theoretical teaching as enables a student to understand the principles of the well described experiments. A useful working handbook, well illustrated and clearly written.

JONES, HARRY C. The Nature of Solution. With a biographical memoir by Prof. E. Emmet Reid and tributes by Professors Arrhenius, Ostwald and Woodward. Ill., 6×9 , 406 pp. \$3.50

CONTENTS: Importance of Solution; Earlier Views as to the Nature of Solution; The Osmotic Pressure of Solutions; Relations Between Solutions and Gases Demonstrated by Vant Hoff; The Theory of Electrolytic Dissociation as Announced by Arrhenius; Diffusion in Solution; Depression of the Vapor-tension of a Solvent by Substances Dissolved in It; Depression of Freezing-Point of a Solvent by the Solute; Aqueous Solutions of Acids, Bases and Salts—Electrolytes; Some Electrical Properties of Aqueous Solutions of Electrolytes; Solution in Nonaqueous and in Mixed Solvents; Colloidal Solutions; Solutions in Solids as Solvents; The Newer Hydrate Theory; The Solvate Theory of Solutions. No subject in chemistry has received more attention, especially during the last quarter of a century, than that of solution. This is due primarily to the fundamental significance of solution for chemical science. Solutions in the

broad sense of the term are fundamental not only for chemistry, but for geology and the various branches of biology. Matter in the pure, homogeneous condition is relatively inert. It becomes active when mixed in a certain way with other matter in the same or in a different state of aggregation—when dissolved. Since solution is so fundamental for the natural sciences in general, and for chemistry in particular, we must know what solutions are, if we would ever make these various branches of science exact. Since chemistry has to do largely with the science of solution, it can become an exact science only by the science of solution becoming exact. We must first know what is the real condition of matter in solution. What laws does it obey? Is the dissolved substance combined with the solvent, and if so with how much of it? The present work is a general discussion of some of the more important properties of solutions, true and colloidal. It is therefore written in a non-mathematical, indeed, largely in a semi-popular style. Prof. Jones wrote this book during the last year of his life, and it was left unpublished. It is now issued, with the aid of several friends and by permission of his widow, as a memorial volume, to put into a permanent record his life-work on the solvate theory on which Prof. Jones investigated sixteen lines of evidence.

KNOX, JOSEPH. *Physico-chemical Calculations.* 5 x 7½, 190 pp. \$1.50

This book is intended for students of physical chemistry, as a supplement to the theoretical matter of lectures and textbooks. Here the theory is applied to the solution of practical problems. The book contains eleven chapters, dealing with the main subdivisions of physical chemistry. Each chapter consists of a short introduction dealing with the theory required for the solution of the problems, a series of typical problems with complete solutions, and a list of problems for solution with answers. Practically all the problems have been taken from the original literature of the subject, and by a careful study of the solved problems the student should learn much. The large collection of problems for solution should prove useful to teachers.

PRIDEAUX, E. B. R. *Problems in Physical Chemistry with Practical Applications.* 13 diagrams, 5½ x 8¾, 323 pp. \$2.00

CONTENTS: Mathematical Methods and Formulæ. Table of Logarithm. Units and Standards of Measurement. Thermochemistry. Systems of One Component. Mixtures. Gas Reactions. Reactions in Solution. Electromotive Force. Kinetics of Molecular and Radioactive Changes.

Provides a series of arithmetical examples that illustrate the more important developments of physical chemistry. A previous knowledge of the fundamental chemical laws, as well as the meaning of elementary physical magnitudes and operations, is assumed and the problems are such as possess a particular importance for the physicochemical investigator and technical chemist. The problems are arranged in sections each preceded by a brief introduction giving such summarized information as is necessary for an intelligent working of the problems. The whole work is progressive in character, sufficient knowledge for the solution of each problem being contained in the preceding sections and the choice of problems is such as can be solved by the aid of general principles and elementary mathematics.

ROTH, W. A. *Exercises in Physical Chemistry.* Authorized translation by A. T. Cameron. 49 ill., 6 x 8¾, 208 pp. \$2.00

CONTENTS: The Determination of Density. Determination of Molecular Weights in Solutions. Thermochemistry. The Determination of Optical Constants. The Thermostat. Chemical Statics and Dynamics. Electrochemistry. Foundations. Electrical Conductivity. Faraday's Law. Transport Numbers. Measurement of Differences of Potential. Electrostatics.

SEETER, G. *Outlines of Physical Chemistry. Second Edition, Revised.* 42 ills., 5 x 7½, 401 pp. \$2.50

(Author is lecturer on chemistry at University of London.)

CONTENTS: Fundamental Principles of Chemistry; The Atomic Theory; Gases; Liquids; Solutions; Dilute Solutions; Thermo-chemistry; Equilibrium in Homo-

geneous Systems—Law of Mass Action; Heterogeneous Equilibrium; The Phase Rule. Velocity of Reaction—Catalysis; Electrical Conductivity; Equilibrium in Electrolytes; Strength of Acids and Bases; Hydrolysis; Theories of Solution; Electromotive Force.

BIOCHEMISTRY

ALEXANDER, JEROME. Colloid Chemistry. An introduction, with some practical applications. Ill., 5 x 7, 96 pp. \$1.00

CONTENTS: Introduction; Classification of Colloids; Consequence of Subdivision; The Ultramicroscope; General Properties of Colloids; Practical Applications of Colloid Chemistry.

A condensed discussion, in very readable style, of the many facts and principles concerning colloids. In a very terse chapter there is a general survey of the practical applications of colloid chemistry which are so manifold and widespread that they touch every branch of science and technology.

BECHHOLD, H. Colloids in Biology and Medicine. Authorized translation from the *Second German Edition*, with notes and emendations by Jesse G. M. Bullowa. 54 illustrations. 6¼ x 9¼, 478 pp. \$5.00

CONTENTS: *Introduction to the Study of Colloids.* Introduction; What Are Colloids? Surfaces; Size of Particles, Molecular Weight, Osmotic Pressure, Conductivity; Phenomena of Motion; Consistency of Colloids; Optical and Electrical properties of Colloids; Methods of Colloid Research. *Tre Biocolloids.* Introduction; Carbohydrates; Lipoids; Proteins; Food and Condiments; Enzymes; Immunity Reactions. *The Organism as a Colloid System.* Significance of the Colloidal Condition for the Organism; Metabolism and the Distribution of Material; Growth, Metamorphosis and Development; The Cell; The Movements of Organism; Blood, Respiration, Circulation and Its Disturbances; Absorption; Secretion and Excretion; The Nerves; Toxicology and Pharmacology; Microscopical Technic. An interesting general survey of the methods and the application of the results of colloid research to biology and medicine, indicating what has been accomplished and forecasting the probable trend of future research.

SPIEGEL, LEOPOLD. Chemical Constitution and Physiological Action. Translated with additions from the German by C. Luedeking and A. C. Boylston. 5¼ x 7¾, 162 pp. \$1.25

CONTENTS: General Considerations; Inorganic Compounds; Organic Compounds; Aliphatic Series; Aldehydes and Ketones; Acids and Derivatives; Aromatic Series; Inner Disinfection; Hydroaromatic Compounds; Nitrogen Compounds; Ammonia and Simple Derivatives; Ammonium Bases; Cyclic Bases and Alkaloids; Group Atropine-Cocaine; Opium Alkaloids and Relatives; Veronal Group; Quinine and Relatives; Purin Group; Hydrazin and Hydroxylamin; Hyponitrous Acid Derivatives; Resume.

A serious and successful attempt to collate what is known of the relations between chemical constitution and physiological action, in order to provide a basis for rational scientific medical treatment. The scope and manner of presentation of the subject-matter makes the book of especial service.

CHEMICAL ANALYSIS

BLASDALE, WALTER C. Principles of Quantitative Analysis. An introductory course. *Second Edition, Revised and Enlarged.* 70 ill., 5¼ x 7½, 414 pp. (Van Nostrand's Textbooks.) \$2.50

(Author is associate professor of chemistry in the University of California.)

CONTENTS: Introductory Statements and Definitions; General Features of Gravimetric Processes; Gravimetric Gas Evolution Processes; Gravimetric Precipita-

tion Processes; Gravimetric Solution and Extraction Processes; Partition Processes; General Features of Volumetric Processes; Volumetric Processes Involving Precipitation; Volumetric Processes Involving Neutralization; Volumetric Processes Involving Oxidation; Physico-Chemical Processes.

This book is broad and general in character. Although it outlines an introductory course in the subject it aims to give the student a brief survey of the whole field by emphasizing a scheme of classification of quantitative processes and elaborating the theoretical and practical features of each type of method, generally, before taking up specific illustrations. The author believes that this method of treatment not only gives the student the best possible foundation for future work in the subject, but also, since it gives him practical experience in dealing with the different types of chemical equilibria, adds to his ability to solve other classes of chemical problems. The illustrations, which are few in number, are elaborated in great detail and with few exceptions represent practical problems chosen from a variety of fields in which the methods of quantitative analysis find use. In each case the facts and theory upon which the process is based are first given, the details of the method of procedure are then outlined and finally a series of questions and problems illustrating the principles used are presented for solution.

BYERS, HORACE G., and KNIGHT, HENRY G. *Notes on Qualitative Analysis.* 6 x 9, 192 pp. *New Edition in Press*

(Authors are professor of chemistry at the University of Washington, and director of experiment station of the University of Wyoming respectively).

CONTENTS: Introduction. Qualitative Analysis. Basis of Identification. Conditions Producing Reactions. Properties Used in Identification. PART I.—Chemical Principles Involved in Qualitative Analysis. Definition of Solution. Kinds of Solution. Phenomena of Solution. Hydrates in Solution. Hydration of Ions. Osmotic Pressure. Van't Hoff's Hypothesis. Freezing Point and Boiling Point of Solutions. Acids, Bases and Salts in Solution. Electrolysis. Hypothesis of Arrhenius. Physical, Chemical, Ionic Equilibrium Solubility Product. Illustrations. PART II.—Metal Analysis. General Directions. Groups; Hydrochloric Acid; Hydrogen Sulphide; Ammonium Sulphide; Ammonium Carbonate; Soluble. PART III.—Acid Analysis. Introduction. The Five Groups. PART IV.—Systematic Analysis. Preliminary Examination. Preparation of the Sample. Tables of Analysis. PART V.—The Rare Metals. Preliminary Statement. The Five Groups. Appendix.

Considerable space is devoted to a very clear exposition of modern physical principles as applied to qualitative analysis. The various group separations and reactions of the metals are fully explained. More attention than is usual in so small a text is given to the analysis of the acids and the rare metals. The grouping of the acids and the general scheme of acid analysis are in some respects new, while ample suggestions for laboratory work are given. Exercises are also given for class work.

ELIOT, C. W., and STORER, F. H. *Compendious Manual of Qualitative Chemical Analysis.* As revised by W. R. Nichols. Newly revised by W. B. Lindsay and F. H. Storer. *Twenty-second Edition.* 5 x 7½, 209 pp. **\$1.25**

CONTENTS: Definition and Scope of Qualitative Analysis; Examples of the Separation; Chlorides Insoluble in Water and Acids; Sulphides Insoluble in Water, Dilute Acids and Alkalies; General and Special Tests for Non-Metallic Elements; Treatment of Substances of Unknown Composition; Reagents; Solutions of Known Composition; Utensils.

OLSEN, J. C. *Textbook of Quantitative Chemical Analysis* by gravimetric, electrolytic, volumetric and gasometric methods. With 74 laboratory exercises giving the analysis of pure salts, alloys, minerals and technical products. *Fifth Edition, Revised and Enlarged.* Ill., 6½ x 9¼, 576 pp. **\$4.00**

(Author is in charge of the Department of Chemistry in Cooper Union.)

CONTENTS: The Balance; General Operations; Determination of Water. *Determination of Metals.* As Oxide; As Sulphate and Sulphide; As Phosphate Chromate and Chloride. *Determination of Acids.* Halogens, Sulphur and Nitrogen; Carbonic, Boric and Phosphoric Acids. *Analysis of Alloys.* Alloys of Silver, Copper, Lead, Bismuth, Cadmium and Tin; Of Alloys Containing Arsenic, Antimony and Tin; Of Alloys Containing Iron, Nickel and Zinc. *Analysis of Minerals.* Minerals Containing Iron, Aluminum and Chromium; Sulphides Containing Manganese, Nickel, Cobalt and Mercury; Carbonates Containing Calcium, Barium, Strontium and Manganese; Silicates; Separation of Sodium and Potassium. *Electrolytic Methods.* The Ionic Theory; Apparatus and Manipulation; Determination of Metals. *Volumetric Methods.* Calibration of Apparatus; Acidimetry; Standard Acids and Alkalies; Titration of Boric and Carbonic Acids. *Oxidation and Reduction Methods.* Potassium Permanganate and Dichromate Solutions; Iodometric Methods. *Precipitation Methods.* Determination of Chlorides, Cyanides and Silver; Phosphoric Acid. *Technical Analysis.* Iron, Steel, Coal; Water; Oils and Fats; Gas; Stoichiometry.

In the preparation of this edition, all atomic and molecular weights as well as factors of weighable precipitates have been recalculated by the 1916 atomic weights. The quantitative methods described have been revised where recent investigations have indicated improvement in the procedure, and where trial in the laboratory has demonstrated the advantage over older methods.

PRESCOTT, A. B., and JOHNSON, O. C. Qualitative Chemical Analysis.

A guide in qualitative work, with data for analytical operations, and laboratory methods in inorganic chemistry. *Seventh Edition, Thoroughly Revised* by John C. Olsen, A.M., Ph.D. $6\frac{3}{4} \times 9\frac{1}{2}$, cloth, 440 pp. **\$4.00**

CONTENTS: *Principles of Analytical Chemistry.* The Chemical Elements and Their Atomic Weights; Periodic System; Classification of the Metals as Bases; Commonly Occurring Acids; Operations of Analysis; Solution and Ionization; Order of Laboratory Study. *The Metals.* The Silver, Tin, Copper, Iron, Zinc, Calcium and Alkali Groups. *The Non-Metals.* Systematic Examination.

This new edition retains all of the excellent features which have given this book such extended use in the past, both as a class room and as a reference text, while adding the results of recent progress in the science. All data and tables have been brought up to date.

PRESCOTT, A. B., and SULLIVAN, E. C. First Book in Qualitative Chemistry. For studies of water solution and mass action. *Eleventh Edition, Entirely Rewritten.* 6×9 , cloth, 148 pp. **\$1.50**

CONTENTS: Qualitative Chemistry; Equivalent Weights; Valence; Chemical Notation and Nomenclature; The Equation; Salts; Acids; Bases; Formulas; Reagents; Solutions; Manipulation; The Analytical Groups: Electrolytic Dissociation; Chemical Equilibrium; Methods of Making a Reaction Complete; Solubility; The Solubility Product; Equilibrium Between Substances with a Common Ion; Hydrolysis; The Periodic System of Elements; Tests for the Metals and the Non-Metals.

SCOTT, WILFRED W. Qualitative Chemical Analysis. A laboratory guide. *Third Edition, Completely Revised and Enlarged.* Ill., $5 \times 7\frac{1}{2}$, 361 pp. **\$3.00**

CONTENTS: Introduction; The Metals; Hydrogen Sulphide Group; Ammonium Sulphide Group; Ammonium Carbonate Group; Soluble Basic Group; The Acids; Silver Nitrate Group; Barium Chloride Group; Soluble Acid Group; Organic Acids; Systematic Analysis of a Substance; Preliminary Examination of a Liquid; Analysis of the Acids; Tables of Reactions of the Metals and the Acids; The Less Common Elements; Rarer Elements of the Ammonium Sulphide Group; The Rare Metals of the Alkali Group.

The purpose of this manual, the first editions of which have met with con-

siderable success, is to furnish a practical modern guide in qualitative analysis. Only methods of procedure that have proved themselves of practical value are included. The text is divided into two general divisions; in the first there is a very clear discussion of the ionic hypothesis, the principles of mass action, solution, and those principles of physical chemistry that now find application in qualitative analysis. The second section covers the various tests, together with the tables of reactions. An unusual amount of information is given in this book in condensed form.

WHITE, GEORGE F. *A Laboratory and Class-room Guide to Qualitative Chemical Analysis.* 5 x 7, 178 pp. \$1.40

(Author is assistant professor of chemistry in Clark College.)

CONTENTS: *Study of Reactions and Analytical Procedures.* Introduction; Theories of Solutions; General Instructions; Reactions of the Base-forming Constituents and Basic Analysis; Reactions of the Acid-forming Constituents. *Systematic Analysis of Unknown Substances.* Preliminary Tests; Analysis of a Solution; Analysis of a Solid Substance for the Base-forming Constituents; Analysis of a Solid Substance for the Acid-forming Constituents. *Appendix* Analytical Tables; Directions for the Preparation of Reagents and Test Solutions; Solubilities of Difficulty Soluble Compounds in Water; Relative Solubilities in Water and Acids; Percentage Ionization of Acids, Bases, and Salts; Table of the Elements Arranged According to the Periodic System; Table of Atomic Weights.

A working manual which presents the essentials of both theory and practice, but which also suggests the possibilities for more extended study and experimentation. In this book a study of reactions has been combined with methods of analysis, the latter being considered as practical applications of previously observed phenomena. Emphasis has been laid in the first part of the course on the reversibility of reactions, equilibrium phenomena, and the laws governing the behavior of electrolytes, while many applications of these principles have been left to the student in his later work.

CHEMICAL CALCULATIONS

ASHLEY, R. HARMON. *Chemical Calculations.* *Second Edition, Revised.* Ill., 5 x 7¼, 286 pp. \$2.50

(Author is assistant professor in chemistry in the University of Maine.)

CONTENTS: Ratios; Approximate Numbers; Interpolation; Heat; Specific Gravity; Gas Calculations; Calculation of Atomic Weights and Formulas; Gravimetric Analysis; Volumetric Analysis; Use of Specific Gravity Tables and Acid Calculations.

Aims to meet the needs of the chemist and the student who will later find occupation in chemical laboratory work. The book encourages and explains the proper use of tables in reference books in solving chemical problems. The work is distinctive in that it contains over five hundred problems of varying degrees of difficulty allowing a wide range of selection to meet the varying requirements of different classes when used as a text-book. The solution of typical problems is indicated in the text and the answers to all problems given.

FOYE, JAMES C. *Chemical Problems.* With brief statements of the principles involved. *Fifth Edition, Revised and Enlarged.* 3¾ x 6, boards, 141 pp. (Van Nostrand Science Series, No. 69.) \$0.75

CONTENTS: Weights and Measures; Thermometric Scales; Volume of Gases Under Varying Pressure, Temperature, and Pressure and Temperature; Specific Gravity; Molecular Weight of Gases; To Find Atomic Weights; Calculation of Molecular Weights from the Symbol; Symbol, Weight and Volume; Symbol and Composition; To Find the Symbol of a Compound, Equation, Weight and Volume; Diffusion of Gases; Specific Heat; Latent Heat; Calorific Power and Intensity; Tables.

HALE, WILLIAM J. *The Calculations of General Chemistry with Definitions, Explanations, and Problems. Second Edition, Revised.* 275 problems, 5 x 7 $\frac{1}{4}$, 185 pp. **\$1.50**

CONTENTS: Units of Measurement. Density and Specific Gravity. The Effect of Pressure upon Gases. The Effect of Temperature upon Gases. The Combined Effect of Pressure and Temperature on Gases. Partial Pressures. Avogadro's Hypothesis and Some of Its Applications. The Law of Definite Proportions. The Derivation of Chemical Formulæ. Calculations Depending upon Chemical Equations. Normal Solutions. Combinations between Gases by Volume. Complex Equations. Tables.

Incorporates only those methods of calculation which have been found most useful in presenting the elementary principles of chemistry. Examples are given to illustrate every possible condition that may arise from the study of any one principle and serve as a guide to the student in the classification of unknown problems. All references to the more advanced and theoretical considerations have been omitted. The book is well adapted for use in quiz classes, and particularly for those accompanying the laboratory work. Through its use the marked deficiency of first-year students in the subject of arithmetical calculations should be largely remedied. The introduction of a book for the student of general chemistry which treats only of these elementary methods is a departure from well established custom. It is believed, however, that the extreme simplicity of the presentation will dispel any fears which an instructor is likely to entertain toward mathematical data, and, in the end, will strengthen the student in his conception of the fundamental principles of the science.

PARTINGTON, J. R. *Higher Mathematics for Chemical Students.* 44 diagrams, 5 x 7 $\frac{3}{4}$, 272 pp. **\$2.50**

(Author is a Fellow in Manchester University.)

CONTENTS: Functions and Limits. Rate of Change of a Function. Differentiation of Algebraic Functions. Maximum and Minimum Values of a Function. Exponential and Logarithmic Functions. Partial Differentiation. Interpolation and Exterpolation. Indefinite Integral. Definite Integrals. Applications of the Definite Integral. Differential Equations. Appendices.

PARTINGTON, JAMES R. *A Text-book of Thermodynamics* (with special reference to Chemistry.) 91 diagrams, 6 x 9, 550 pp. **\$4.00**

CONTENTS: Thermometry and Calorimetry; The First Law of Thermodynamics and Some Applications; The Second Law of Thermodynamics, Entropy; The Thermodynamic Functions and Equilibrium; Fluids; Ideal and Permanent Gases; Changes of Physical State; Van der Waals' Equation and the Theory of Continuity of States; Thermochemistry; Gas Mixtures; Elementary Theory of Solutions; General Theory of Mixtures and Solutions; Capillarity and Adsorption; Electrochemistry; The Theorem of Nernst; Kinetic Theories in Thermodynamics.

Expounds the principles of thermodynamics and illustrates their applicability to the various problems of physical chemistry. Chemical problems receive the main consideration and other branches are either briefly treated or omitted. The author aims to show that a comprehension of the fundamentals of thermodynamics may be applied advantageously to the solution and interpretation of modern experimental work.

STEVENS, A. B. *Arithmetic of Pharmacy. Fourth Edition, Revised and Enlarged* Ill., 5 x 7, 110 pp. **\$1.50**

CONTENTS: Weights and Measures; Volumetric Analysis; Specific Gravity of Gases; Volumetric Combination and Decomposition of Gases; Mensuration of volumes; Tables.

CHEMICAL TECHNOLOGY

INDUSTRIAL CHEMISTRY**AMERICAN INSTITUTE OF CHEMICAL ENGINEERS. Transactions.**

Vol. I., 1908. 41 ill., 5 folding plates, $6\frac{1}{2} \times 9\frac{1}{2}$, 212 pp. **\$6.00**

CONTENTS: Steam Power Plant Economics, by William Miller Booth; Testing and Performance of Steam Generating Apparatus, by A. Bement; The Examination of Flue Gases in Boiler Tests, by H. August Hunicke; Heating of Industrial Furnaces with Pulverized Fuel, by Richard K. Meade; Modern Electrical Resistance Pyrometry, by Edwin T. Northrup; Chemical Specifications for Sulphite Pulp, by J. A. DeCew; Purity of Commercial Liquefied Ammonia Gas and Apparatus for Testing It, by F. W. Frerichs; The Sanitary Condition of the Southern End of Lake Michigan, by J. Herbert Brewster; The Ferric Iron Contact Process of Making Sulphuric Acid from Smelter Fumes, by Thorn Smith; Calculations for Dryer Design, by William M. Grosvenor; Charts accompanying this paper (in pocket in back cover): Table Ia, Density, Humid Volume, etc., of Air Under Various Conditions; Table Ic, Rate of Cooling of Water-Saturated Air; Table IIb, Rate of Convection in Pipes; Humidity Chart; Loss of Heat from Pipes.

Vol. II. 1909. 50 ill., 1 folding plate, $6\frac{1}{2} \times 9\frac{1}{2}$, 312 pp. **\$6.00**

CONTENTS: The Centering of Great Industries in the New York Metropolitan District, Chas. F. McKenna. Chemical Industries of America, Prof. Chas. E. Munroe. Conservation and the Chemical Engineer, Samuel P. Sadtler. Efficiency Limits in the Power-gas Producer, Prof. Wm. D. Ennis. The Utilization of Low Grade Fuels in the United States, O. K. Zwingberger. Heat Efficiency of Smokeless Combustion and Heat-absorbing Capacity of Boilers, A. Bement. Chemical Composition of Illinois Coal and the Relation of Heating Value to Composition, A. Bement. Creosote Oil from Water-gas Tar, Samuel P. Sadtler. Some Experiments on the Case-hardening of Steel by Gases, John C. Olsen, John F. Wiefenbach, and John R. Brierly. An Automatic Acid Egg, R. K. Meade. A Method of Clay Control for the Manufacture of Cement, John G. Dean. Colloids and the Ultramicroscope, Jerome Alexander. The Utilization of Waste India-rubber, Stephen P. Sharples. On the Permanence and Acidity of Hydrogen Peroxide Solution, Launcelot W. Andrews. Commercial Extraction of Grease and Oils, William M. Booth. Glycerine Refining in Multiple-effect Stills, F. J. Wood. The Advantages of Multiple-effect Distillation of Glycerine and other Products, A. C. Langmuir. Electric Furnace for Smelting of Iron Ore, Edward R. Taylor. Waterways and Water Power, Edward R. Taylor.

Vol. III., 1910. 59 ill., 2 folding plates, $6\frac{1}{2} \times 9\frac{1}{2}$, cloth, 411 pp. **\$6.00**

CONTENTS: Evolution of Portland Cement Processes, Chas. F. McKenna. Study of Materials in Chemical Engineering, Chas. F. McKenna. Reports of the Committee on Chemical Engineering Education, F. W. Frerichs. Remarks on Chemical Engineering Education, F. W. Frerichs. Development of the Chemist as an Engineer, F. W. Atkinson. The Training of Chemical Engineers which Meets the Requirements of Manufacturers, M. C. Whitaker. Teaching Industrial Chemistry, A. H. Sabin. Commercial Manipulation of Refractory Elements for Incandescent Lamp Purposes, Ralph E. Myers. The Manufacture and Industrial Applications of Ozone, Oscar Linder. The Changes in Industrial Chemistry Caused by Electricity, E. R. Taylor. Notes on the Corrosion of Iron and Steel and its Prevention, G. W. Thompson. Protal; a New Product for Use in the Arts, F. G. Wiechmann. Chemical Industries of Canada, J. C. De Cew. Underground Waters for Manufacturing Purposes, Wm. M. Booth. Loss in Coal Due to Storage, A. Bement. Nitric and Mixed Acids, Schuyler Frazier. Plant Design, Wm. M. Grosvenor. The Fitzgibbon Boiler, J. Alexander. Manufacture of Hydrated Lime, R. K. Meade. Bleaching Oils with Fuller's Earth, David

Wesson. SYMPOSIUM ON SEWAGE DISPOSAL. Principles of Sewage Disposal, G. C. Whipple. Sewage Disposal in Europe, Rudolph Hering. Sewage Disposal in New York City and Vicinity, G. A. Soper. Sanitary Conditions in Their Relations to Water Supplies in the Vicinity of New York, N. S. Hill, Jr. Unsolved Problems of Sewage Disposal, C.-E. A. Winslow.

Vol. IV., 1911. 78 ill., $6\frac{1}{2} \times 9\frac{1}{2}$, 518 pp.

\$6.00

CONTENTS: Some Problems in Chemical Engineering Practice; Extraction of Bismuth from Carbonaceous Ores. The Classen Lignum Company. The Plant of the Kentucky Soda Ash Company. The Manufacture of Chloroform from Bleaching Powder and Ethyl Alcohol. Construction of Laboratory Apparatus. Manufacture and Testing of Shipping Cylinders for Anhydrous Ammonia, F. W. Frerichs, The Manufacture and Testing of Carbonic Acid Cylinders, John C. Minor, Jr. Report of the Committee on Chemical Engineering Education, Sam'l. P. Sadtler. The Four-Year Course in Chemical Engineering, Jos. H. James. The Question of Five-Year Engineering Courses at Ohio State University, Jas. R. Withrow. A Course in Chemical Engineering Education, J. C. Olsen. Industrial Chemical Calculations, Jos. W. Richards. The Practical Value of Determination of British Thermal Units of Anthracite Coal, S. F. Peckham. Two Methods of Testing Asphalt. S. F. Peckham. Explosives Used in Engineering and Mining Operations, Clarence Hall. Problems in the Manufacture of C. P. Acids, J. T. Baker. Combustion of Pulverized Coal, L. S. Hughes. Distribution of Power in Portland Cement Manufacture, Richard K. Meade. Hardening of Plasters and Cements and a Simple Chronographic Apparatus for Recording Set, Chas. F. McKenna. The Manufacture of Gelatine, Ludwig A. Thiele. The Adoption of the Centrifugal Pump to Chemical Problems, F. G. Wheeler. *Symposium on the United States Patent System.* The Institute and the United States Patent System, Wm. M. Grosvenor. The United States Patent Office, E. B. Moore. Protection of Inventions by Patents. Existing Defects and Remedies, Walter D. Edmonds. The United States Patent System, Robt. N. Kenyon. Report of Committee on Patents.

Vol. V., 1912. 61 ill., 2 folding plates, $6\frac{1}{4} \times 9\frac{1}{2}$, 288 pp.

\$6.00

CONTENTS: Phenol-Formaldehyde Condensation Products, L. H. Backeland; Protection of Intellectual Property in Relation to Chemical Industry, L. H. Backeland; Notes on a Study of the Temperature Gradients of Setting Portland Cement, A. S. Cushman; Production of Available Potash from the Natural Silicates, A. W. Cushman and G. W. Coggeshall; Potash, Silica and Alumina from Feldspar, Edward Hart; Chemical Investigation of Asiatic Rice, A. S. Cushman and H. C. Fuller; United States Beehive Coke Oven Industry, A. W. Belden; Action of Disinfectants on Sugar Solutions, G. P. Meade; Linseed Oil Decomposition During Drying, J. C. Olsen and A. E. Ratner; Tests on the Opacity and Hiding Power of Pigments, G. W. Thompson; Initial Setting Time of Portland Cement Control, E. E. Ware; Effect on the Eyesight of "Lime Sulphur" Spray Manufacture, James R. Withrow; Acetylene Solvents, J. H. James; Columbia University's New Chemical Engineering Course and Laboratories, M. C. Whitaker; Need of Standard Specifications in Oils for Paving Block Impregnation, J. H. Campbell; Presence of Oxygen in Petroleums and Asphalts, S. P. Sadtler; Chemical Engineer and Industrial Efficiency, Wm. M. Booth; Water for Industrial Purposes, Wm. M. Booth; Availability of Blast Furnace Slag as a Material for Building Brick, Albert E. White; Technical Accounting and Chemical Control in Sugar Manufacture, David L. Davoll, Jr.; Bituminous Rocks of the U. S. and Their Use for Street Surfaces, S. F. Peckham; Code of Ethics.

Vol. VI., 1913. Ill., $6\frac{1}{4} \times 9\frac{1}{4}$, 272 pp.

\$6.00

CONTENTS: Efficiency in Chemical Industries, The Corn Products Industry, T. B. Wagner; Effect of Legislation upon Chemical Industries, T. B. Wagner; Distribution of Heat in the Operation of Steam Boilers, Perry Barker; General Efficiency in Dye Houses and Bleach Works, L. J. Matos; Depreciation and Obsolescence, R. K. Meade; Legal Control of Dangers to Health in Factories, C. F. McKenna; Low and Mixed Pressure Turbines, J. G. Callan; Import Duties on Chemicals and Their Influence on Chemical Industries, F. W. Frerichs; Drying of Linseed Oil with Red Lead and White Lead, J. C. Olsen and A. H. Callaghan;

A Peculiar Form of Lake Pollution, Wm. P. Mason; Relation of the Manufacturer to the Patent System, Wm. M. Grosvenor; Effect of Climate on Plant Location, Wm. M. Booth; Recent Developments in Commercial Explosives, A. A. LeSueur; Electrolysis, Using Supported Mercury Kathode, E. A. LeSueur; A Self-Dumping Filter Press, E. J. Sweetland; A New Filter Press, A. Burger; Ozone; Its Manufacture and Use, A. Vosmaer; Apparatus for Determining Non-Condensing Gases in Ammonia, F. W. Frerichs; The Present Status of the Wood Turpentine Industry, E. H. French and Jas. R. Withrow; Code of Ethics.

Vol. VII., 1914. Ill., $6\frac{1}{4} \times 9\frac{1}{4}$, 313 pp.

\$6.00

CONTENTS: Some Professional Obligations, M. C. Whitaker; Distribution of Industrial Opportunities, Geo. O. Smith; Report of the Committee on Chemical Engineering Education; Present Status of Chemical Engineering Work of the American Institute of Chemical Engineers; The Need of Revised Chemical Statistics, Bernard C. Hesse; Application of Physical Chemistry to Industrial Processes, Walter F. Rittman; Use of Hydrometallurgical Apparatus in Chemical Engineering, John V. N. Dorr; Studies on Filtration, J. W. Bain and A. E. Wigle; Scrubber for Chemical Laboratory Vacuum System, Charles Baskerville; Shoddy and Carbonized Waste, Louis J. Matos; Chemistry of the Bleaching of Cotton Cloth, John C. Hebden; Ozone in Ventilation, J. C. Olsen and Wm. H. Ulrich; The Present Patent Situation, Maximilian Toch; Development of the Rotary Kiln and Its Application to Various Chemical and Metallurgical Processes, Richard K. Meade; A Combination Water Softener and Storage Tank, L. M. Booth; Feldspar as a Possible Source of American Potash, Allerton S. Cushman and George W. Coggeshall; The Hardwood Distillation Industry in America, Edward H. French and James R. Withrow; Painting Defects: Their Causes and Prevention, G. W. Thompson.

Vol. VIII., 1915. 44 ill., $6\frac{1}{2} \times 9\frac{1}{2}$, 312 pp.

\$6.00

CONTENTS: Resources and Possibilities of Chemical Industry in the Southwest, Edgar Baruch; The Chemical Evidence of Smelter Smoke Injury to Vegetation, J. P. Mitchell; Cottrell Processes of Electrical Precipitation, Walter A. Schmidt; The Fleming Patent Dust-Collecting System, W. C. Hanna; The Thiogen Process for Removing Sulphur Fumes, S. W. Young; The Manufacture of Cream of Tartar, Otto Best; Engineering Features of Wine Making, Arthur Lachman; The Treatment of Sewage by Aeration in the Presence of Activated Sludge, Edward Bartow; A New Electrolytic Method of Sewage Disposal, J. C. Olsen; Costs as Applied to Professional Business, Ralph A. Gould; The Improvement of High Boiling Petroleum Oils, and the Manufacture of Gasoline as a By-Product Therefrom, by the Action of Aluminum Chloride, A. M. McAfee; Some American Contributions to Industrial Chemistry, Samuel P. Sadtler; The Development in the United States of the Manufacture of Products Derived from Coal, H. W. Jordan; Notes on a New Process of Bleaching, S. F. Peckham; Lutes and Cements, S. S. Sadtler; The Design and Operation of Ozone Water Purification Systems; Sheppard T. Powell; Changes in the Volume and Specific Gravity of Linseed Oil Films on Drying, G. W. Thompson; The Utilization of Wood Waste, Arthur D. Little; The Production of Ammonia from Cyanamid, W. S. Landis.

Vol. IX., 1916. 81 ill., folding plate, $6\frac{1}{4} \times 9\frac{1}{4}$, 432 pp.

\$6.00

CONTENTS: Unpreparedness, George D. Rosengarten; The Human Side of the Development of Chemical Industry, O. W. Thompson; Report of Committee on Chemical Engineering Education at San Francisco Meeting, Jas. R. Withrow; Report of Committee on Chemical Engineering Education at Baltimore Meeting, Jas. R. Withrow; Report of Committee on Chemical Engineering Education at Cleveland Meeting, Jas. R. Withrow; Report of Committee on Chemical Engineering Education at New York Meeting, Jas. R. Withrow; The Metallurgy of the Rarer Metals, J. W. Richards; Acid Resisting Alloys, W. C. Carnell; A Study of the Effect of Storage on Mixed Paints, E. E. Ware and R. E. Christman; Water Powers of the Western United States, Herman Stabler; The Treatment of Sewage by Aeration in the Presence of Activated Sludge II, Edw. Bartow; The Recovery of Benzol from Gas, F. W. Sperr, Jr.; Development in Chemical Engineering Equipment, H. D. Miles; The Effect of Centrifugal Force on Colloidal Solutions.

Eugene E. Ayres, Jr.; Corrosion of Ingot Iron Containing Cobalt, Nickel or Copper, H. T. Kalmus and K. B. Blake; Nitric Acid Sophistication, Jas. R. Withrow; A New Method for the Control for the Chamber Process for Making Sulphuric Acid, Andrew M. Fairlie; The Fixation of Nitrogen, John E. Bucher.

Vol. X., 1917. Ill., $6\frac{1}{4} \times 9\frac{1}{4}$, 484 pp.

\$6.00

CONTENTS: Our Resources, G. W. Thompson; Report of Committee on Chemical Engineering Education at Buffalo Meeting, Jas. R. Withrow; Report of Committee on Chemical Engineering Education at St. Louis Meeting, Jas. R. Withrow; Intensive Preparatory Chemistry, Chas. S. Palmer; The Possibilities of Developing an American Potash Industry, Richard K. Meade; A New Method for the Recovery of Salts of Potassium and Aluminum from Mineral Silicates, J. C. W. Frazer, W. W. Holland, E. Miller; The Recovery of Potash from Beet-sugar House Waste Liquors, H. E. Zitkowski; The Potash Industry of Canada, E. B. Biggar; Some Machinery Employed in the Manufacture of Glue, A. Lowenstein; The Manufacture of Linseed Oil, Glenn H. Pickard; Industrial Wastes Disposal, H. P. Eddy; The Treatment of Sewage by Aeration in the Presence of Activated Sludge, Edward Barlow; Chemical Engineering Aspect of Renovating a Sulphite Mill, Hugh K. Moore; Waste Heat Utilization, H. D. Baylor; Relation Between Efficiency of Refrigerating Plants and the Purity of Their Ammonia Charge, F. W. Frerichs; Distilled Water, Wm. M. Booth; Engineering in Chemical Works, Gaston DuBois; Organization in Chemical Industries, Frank Hemingway; Some General Aspects of Evaporation and Drying, P. B. Sadtler, F. M. deBeers; Drying Chestnut Extract by the Cardem Process, Harry McCormack.

Vol. XI., 1918. Ill., $6\frac{1}{4} \times 9\frac{1}{4}$, 432 pp.

\$6.00

CONTENTS: The Human Elements in the Mill, Hugh K. Moore; Maintenance and Construction Organization of Sulphite Mill, W. E. Taft; Manufacture of Alcohol from Sulphite Waste Liquor, Ralph H. McKee; The Manufacture of Fuel Situation, Wm. M. Booth; The Leading Methods of Graining Sugar, H. E. Zitkowski; War Pyrotechnics, G. A. Richter; Some Phases of Chemical Manufacture in Japan, A. Hirsch; Chemical Stoneware, A. Malinovzsky; The Expansion of the Coal Tar Chemical Industry in the United States, F. E. Dodge; Opportunity for Expansion of By-Products Industry of Coal and Water Gas Plants, Walter M. Russell; Synthetic Phenol A. G. Peterkin; The Multiple Tangent System for the Manufacture of Sulphuric Acid, L. A. Thiele; Fused Silica, Its Properties and a Few of Its Uses, Stephen L. Tyler; Storage Tanks Made of Reinforced Concrete, F. F. Frerichs; Concrete as a Chemical Engineering Material, Maximilian Toch; Report of the Committee on Chemical Engineering Education; Some Wild Engineering I Have Known, David Wesson; Belting for Power Transmission, Ernest D. Wilson; Symposium on Maintenance and Preservation of Our Chemical Industry, Maximilian Toch; Recommendation of the Tariff Commission in Regard to Dyes and Coal Tar Chemistry, Grinnell Jones, U. S. Tariff; The Maintenance and Preservation of Our Chemical Industry, Robert Hilton; Development in the Production of Dyes and Intermediates, Edward Holton; The Importance of the Research Chemist and Team Work in Developing Our Chemical Industry, Colby Dill; The Enameled Steel Industry, Wm. Zimerli; Future of the Barium Industry, Hugh Hollin; Reconstruction Aspects of Some Chemical Industries in the United States To-day, Edward Gudeman; The Present Status of Nitrogen Fixation, Lt. Col. Alfred H. White; Synthetic Pharmaceuticals and the Patent Law, Julius Stieglitz.

Most of the papers describe improvements in the manufacture of staple chemical products, such as glycerine, iron, fuels, etc. In most cases full details of processes with diagrams of apparatus are given.

Annual Reports on the Progress of Chemistry for 1918. Vol. XV. Issued by the Chemical Society. $6 \times 8\frac{1}{2}$, 249 pp.

\$2.00

CONTENTS: General and Physical Chemistry, by H. M. Dawson; Inorganic Chemistry, by E. C. C. Baly; Organic Chemistry: Part I., Aliphatic Division, by J. C. Irvine; Part II., Homocyclic Division, by F. L. Pyman; Part III., Heterocyclic Division, by A. W. Stewart; Analytical Chemistry, by C. A. Mitchell;

Physiological Chemistry, by F. G. Hopkins; Agricultural Chemistry and Vegetable Physiology, by E. J. Russell; Radioactivity, by F. Soddy.

Since 1904 these "Reports" have given systematic data on the advances made each year in the various departments of chemistry for the benefit of all workers, students or teachers or those chemists who are engaged in technical or manufacturing applications of chemistry.

Vols. I., 1904, to XV., 1918, inclusive.

Each, \$2.00

DYSON, S. S. *A Manual of Chemical Plant.* Ill., 7 x 10. In twelve parts. (Not sold separately.) paper, \$7.50

A record of the practical outcome of research and experiment as embodied in the range of plant which is actually available for the carrying out of the operations and processes of industrial chemistry. The work therefore places in the hands of the chemical engineer, the chemical manufacturer, the chemical works manager, and the student of chemical technology the results of a long and patient examination of the claims of almost every new piece of chemical plant that has been introduced during the last twenty-five years, together with an exhaustive analysis of the patent literature of the same

DYSON, S. S., and CLARKSON, S. S. *Chemical Works, Their Design, Erection, and Equipment.* 80 ill., 9 folding plates, 6½ x 10, 220 pp. \$9.00

CONTENTS: Choice of Site. Notes on Materials Used in Construction. First Principles in Laying Out a Works: Arrangement of Buildings; Stores; Workshop; The Drainage System; Foundations; Retaining Walls; Fire Prevention; Ambulance Arrangements. The Power House: Boilers; Coal Store; Automatic Weighing Machines; Chimney; Economizers; Steam Engines; Steam Turbines. Sulphuric Acid Plant: General Design; Chambers; Glover Tower; Gay-Lussac Tower; Notes on Vitriol Manufacture; Recent Developments in Vitriol Plant Design and Working. Hydrochloric Acid Plant. Nitric Acid Plant. Notes on High Explosives Plant. Sulphate of Ammonia Plant. Notes on Artificial Manure Plant. General Plant. **APPENDIX.**—On the Chemical Engineer. The Saw-Mill and Box-Making Department. The Alkali, etc., Works Regulation Act: (a) Alkali Works and Alkali Waste; (b) Sulphuric Acid, Muriatic Acid and Other Specified Works; (c) Regulation of Works: Inspection; Special Rules; Procedure. "Welfare Work" or "Prosperity Sharing."

ELLIS, C. *Ultraviolet Light, Its Application in Chemical Arts.* Ill., 5 x 7½. *In Press*

GRAY, H. H. *Gas-Works Products.* 5½ x 8¾. (Industrial Chemistry Series.) *In Press*

GREENWOOD, H. C. *The Industrial Gases.* 5½ x 8¾. (Industrial Chemistry Series.) *In Press*

McNAIR, JAMES B. *Citrus By-Products.* *In Press*

CONTENTS: Necessity for the Industry; By-Products from the Rind, Pulp, Seeds, and Where the Whole Fruit is Used; By-Products from the Flowers, Leaves and Stems; Cost of By-Products and Market Conditions; The Industry in North America, South America, Europe, Asia, Africa and Australia; Appendix.

KREMANN, R. *The Application of Physico-chemical Theory to Technical Processes and Manufacturing Methods.* Authorized translation by Harold E. Potts, M.Sc. 35 diagrams, 6 x 9, 215 pp. \$3.00

CONTENTS: The Two Fundamental Laws of the Mechanical Theory of Heat. Reaction Velocity and Catalytes. Other Special Applications of the Law of Mass Action. The Influence of Temperature on the Equilibrium Constant. Dissociation Pressure. Application of the Phase Rule. Application of the Phase Rule to Solid Liquid Systems. Transformation Phenomena in Hydraulic Binding Agents. Other Applications of the Phase Rule. The Distribution Law. Reciprocal Pairs of Salts.

ROGERS, ALLEN (Editor). *Industrial Chemistry.* A manual for the student and manufacturer. Written by a staff of forty-two eminent specialists. *Third Edition, Thoroughly Revised and Enlarged.* 377 ill., 6½ x 9¾, 1255 pp. **\$7.50**

CONTENTS: General Processes by Allen Rogers; Water for Industrial Purposes by H. Stabler and A. A. Chambers; Fuels by J. C. W. Frazer; Sulphuric Acid by W. M. Grosvenor; Nitric Acid by W. M. Grosvenor; Salt and Hydrochloric Acid by O. L. Shinn; Elements and Compounds by Allen Rogers; Chlorine and Allied Products by W. F. Doerflinger; Electrochemical Industries by W. L. Landis; Lime, Cement and Plaster by Richard K. Meade; Clay, Bricks and Pottery by Allen Rogers; Glass by James Gillinder; White Lead by G. W. Thompson; Zinc Oxide by George B. Heckel; Pigments and Paint Oils by Maximilian Toch; Mixed Paints by Henry A. Gardner; The Metallurgy of Iron and Steel by Bradley Stoughton; Fertilizers by A. G. Stillwell; Commercial Organic Chemicals by Allen Rogers; Illuminating Gas by W. H. Fulweiler; Coal Tar and its Distillation Products by F. E. Dodge; The Petroleum Industry by Thomas T. Gray; The Destructive Distillation of Wood by W. B. Harper; Oils, Fats and Waxes by Carleton Ellis; Linseed Oil by G. W. Thompson; Hydrogenation of Oils by Carleton Ellis; Lubricating Oils by Augustus H. Gill; Soaps and Soap Powder by Lincoln Burrows; Glycerine by A. C. Langmuir; Laundering by W. F. Faragher; Essential Oils, Synthetic Perfumes and Flavoring Materials by Alois von Isakovics; Turpentine and Rosin by Charles H. Herty; Resins, Oleo-Resins, Gum Resins and Gums by Allen Rogers; Shellac by A. C. Langmuir; Rubber and Allied Gums by Frederic Dannerth; Varnish by A. H. Sabin; Sugar by Guilford L. Spencer; Starch, Glucose, Dextrin and Gluten by G. W. Rolfe; Brewing and Malting by Robert Wahl; Wine Making by L. W. Haas; Distilled Liquors by Gustave L. Goob; Textiles by J. Merritt Matthews; Dyestuffs and their Application by L. A. Olney; The Art of Paper Making by G. F. Lull; Cellulose Industries by Jasper E. Crane; Explosives by O. W. Willcox; Leather by Allen Rogers; Glue and Gelatine by Jerome Alexander; Casein by E. L. Tague; Practical Applications of Colloid Chemical Principles by Jerome Alexander; Dehydrated, Dried and Evaporated Foods, Condensed Foods by Clarence V. Ekroth; Baking by Arnold Wahl.

Aims to furnish a complete text on industrial chemistry that shall be recognized as a standard of modern methods and processes. The subject matter is essentially descriptive without omitting the necessary theoretical considerations, and each chapter follows as far as possible this general plan. The raw material, the treatment of raw material preparatory to manufacture and manufacturing processes, its chemical theory and reactions involved. The illustrations are numerous and wherever possible references are cited.

ROGERS, ALLEN. *Laboratory Guide of Industrial Chemistry.* *Second Edition, Entirely Rewritten and Enlarged.* 33 ill., 5½ x 8¼, 219 pp. **\$2.00**

CONTENTS: General Process; Inorganic Preparations; Organic Preparations; Dyeing of Textile Fibers; Pigments and Lakes; Driers, Varnishes, Paints and Stains; Soap and Allied Products; Leather Manufacture; Wood Fiber, Pulp and Paper; Useful Data.

The object of this elementary laboratory guide is to acquaint students of chemistry with actual commercial problems by bringing to their experience practical methods of handling materials on a large scale; the care and use of machinery; the cost of raw materials; transportation, wage system, handling of men and shop discipline. The processes described for application on a small scale are adaptable to the larger commercial bases, and in many instances the methods are those commonly used at present, and actual factory practice is carried out.

ROGERS, ALLEN. *Elements of Industrial Chemistry.* An abridgement of "Manual of Industrial Chemistry," written by forty specialists and

edited by Dr. Rogers. 117 ill., 1 folding plate, $5\frac{1}{2} \times 8$, 521 pp. \$3.00

(Author is in charge of industrial chemistry at Pratt Institute.)

CONTENTS: General Processes; Water for Industrial Purposes; Fuels; Sulphuric Acid; Nitric Acid; Hydrochloric Acid; Elements and Compounds; Electrochemical Industries; Lime, Cement and Plaster; Ceramic Industries; Pigments and Paints; Iron and Steel; Fertilizers; Organic Chemicals; Illuminating Gas; Coal Tar and Distillation Products; Petroleum; Distillation of Wood; Oils, Fats and Waxes; Soap and Glycerine; Essential Oils; Gums and Resins; Sugars, Starch and Glucose; Brewing; Wine Making, and Distilling; Textiles; Dyestuffs; Paper and Cellulose Industries; Explosives; Leather.

The manufacturing processes employed in the various chemical industries are usually not merely a matter of complicated machinery, but depend largely on the employment of chemical formulas that have been evolved after many years of research and experiment. This book, written especially for the student and the general reader, aims to give in concise, clear terms the fundamental principles which govern the methods and operations of these complicated industries. Much care has been exercised in making the subject matter explicitly descriptive, and a certain amount of theoretical consideration has been included where it was necessary for the proper understanding of the context. Stress is laid on the fact that while proper machinery is an important factor in the various industries, chemical science is the foundation and machines and processes must be employed that conform to the principles of that science. Good pictures of machinery are given throughout the work.

ROHLAND, PAUL. *The Colloidal and Crystalloidal State of Matter.*

Translated by W. J. Britland and H. E. Potts. $5 \times 7\frac{1}{2}$, 54 pp.

Reprinting

CONTENTS: History of Colloids. List. Formation of Colloids in Nature Colloids and Crystalloids. Diffusion. Osmotic Pressure. Freezing Point and Boiling Point. Molecular Weight. Optical Behavior. Coagulation and Crystallization. Electrical Behavior. Colloidally Composed Substances. Permeability. Toxicity. Water of Gelatinization. Viscosity. Adsorption and Failure to React. Adhesion. Colloids in Technology and Industry. Colloids in Nature. Autogeneity and Plasmogeneity. Monistic and Dualistic Conception of the Universe.

SCHEELE, C. W. *A Re-issue of the Chemical Essays.* Translated from the Transactions of the Academy of Sciences at Stockholm. With additions. First published in 1786. $5\frac{1}{2} \times 8$, 300 pp. \$2.50

VAN NOSTRAND'S Chemical Annual. A handbook of useful data for analytical, manufacturing, and investigating chemists, chemical engineers and students. Edited by John C. Olsen and M. P. Matthias. *Fourth Issue, 1918, Thoroughly Revised and Enlarged.* $5 \times 7\frac{1}{2}$, flexible fabrikoid, 796 pp. \$3.00

CONTENTS: General (14 tables); Calculation of Volumetric Analyses (33 tables); Specific Gravity Tables (25 tables); Alcohol Tables of the Bureau of Standards (11 tables); Specific Gravity Tables (35 tables); Vapor Tension Tables (11 tables); Equivalents of Weights and Measures (11 tables); Thermochemistry (23 tables); Stoichiometry; New Books.

This book supplies chemist, chemical engineer, physicist, and research metallurgist with a mass of reliable data, gathered and edited in such form as to enable ready reference. In the preparation of this issue a very thorough revision of all tables has been made. Molecular weights and factors have been recalculated in accordance with the 1917 table of atomic weights. All physical constants of the elements have been revised in accordance with new data which have been published. New compounds have been added to the tables in the endeavor to include substances which have come into common use. In many cases this has not been possible because the properties of such compounds have not been studied or the results of such studies published. About 48 new

tables have been added. Some of these replace tables previously published as the new tables are considered more accurate or reliable. The new tables include tables on the properties of the elements, tables bearing on calibration and the true volume of glass vessels, the use of indicators, the properties of oils, alloys, glass, etc., specific-gravity tables, vapor pressure, units of weights and measures, the capacity of tanks, conversion of units of heat, electricity, temperature, etc., freezing-point mixtures, etc.

TECHNICAL ANALYSIS

LUNGE, GEORGE. *Technical Chemists' Handbook.* Tables and methods of analysis for manufacturers of inorganic chemical products. *Second Edition, Revised.* 5 x 7, leather, 280 pp. **\$4.00**

CONTENTS: General Tables; Fuel and Furnaces, Sulphuric Acid Manufacture, Saltcake and Hydrochloric Acid; Bleaching Powder and Chlorate of Potash Manufacture; Soda Ash Manufacture by the Leblanc Process; Manufacture of Soda by the Ammonia Process; Caustic Soda; Electrolytic Alkaline Liquors; Nitric Acid Manufacture; Potassium Salts; Ammonia Manufacture; Coal-Gas Manufacture; Calcium Carbide and Acetylene; Examination of the Raw Materials and Products of the Manufacture of Fertilizers; Alumina Preparations; Cement Industry; Preparation of Standard Solutions; Rules for Sampling; Comparison of the Hydrometer Degrees According to Baumé and Twaddell, with the Specific Gravities; Value of Alkali per ton.

In this edition all analytical factors have been recalculated on the basis of the atomic weights published by the International Committee for 1916. This has involved numerous changes, many of them of importance even for merely practical purposes. The tables of specific gravities and other tables have been selected from among the most recent reliable determinations.

LUNGE, GEORGE. *Technical Methods of Chemical Analysis.* English translation from the latest German edition, edited by Charles Alexander Keane, with the collaboration of eminent specialists. In three volumes. *New Edition in Press*

Vol. I.

CONTENTS: Technical Gas Analysis; Fuel Analysis; Sulphurous Acid, Nitric Acid and Sulphuric Acid; Saltcake and Hydrochloric Acid; Sodium Carbonate; The Chlorine Industry; Potassium Salts; Cyanogen Compounds; Clay; Clay Wares, Earthenware and Glazes; Aluminum Salts and Alumina; Glass; Calcareous Cements; Drinking Water and Water Supplies; Feed Water for Boilers and Water for other Technical Purposes; Sewage and Effluents; Soils; Air.

Vol. II.

CONTENTS: Iron. Metals other than Iron, and Metallic Salts. Artificial Manures-Feeding Stuffs. Explosives. Matches and Fireworks. Calcium Carbide and Acetylene. Illuminating Gas and Ammonia. Coal Tar. Organic Dyes.

Vol. III.

CONTENTS: Mineral Oils; Lubricants; Oils, Fats and Waxes; Special Methods of Analysis Employed in the Oil and Fat Industries; Resins, Balsams, and Gum-Resins; Drugs and Galenical Preparations; Essential Oils; Tartaric Acid; Citric Acid; Organic Preparations; India Rubber and Rubber Goods; Vegetable Tanning Materials; Leather; Ink; Sugar; Starch and Dextrin; Alcohol, Potable Spirits, and Liquors; Vinegar; Wine; Brewing Materials and Beer; Paper; Textile Fibres; Inorganic Colors.

RICHARDS, W. A., and NORTH, H. B. *A Manual of Cement Testing.* For the use of engineers and chemists in colleges and in the field. 56 ill., 5¾ x 8, 147 pp. **\$1.50**

CONTENTS: Classification, Composition, Manufacture. Sampling. Fineness.

Specific Gravity. Normal Consistency. Constancy of Volume. Tensile Strength. Compressive Strength and Transverse Tests. Sand and Stone. Laboratory Equipment. Part Played by Chemical Analysis. Preparation of Sample for Analysis. Analysis of Cement, Limestone, Marl, Slag and Clay. Standard Specifications for Portland Cement.

SCOTT, WILFRED W. (Editor). **Standard Methods of Chemical Analysis.**

A manual of analytical methods and general reference for the analytical chemist and for the advanced student. *Second Edition, Revised.* 143 ill., 3 colored plates, 6 x 9, 929 pp. **\$6.00**

(The following specialists have written chapters for this book: H. A. Baker, L. C. Barton, F. G. Breyer, B. S. Clark, Wallace G. Derby, Wm. F. Doerflinger, D. K. French, H. A. Gardner, A. H. Gill, F. E. Hale, R. E. Hickman, W. B. Hicks, R. K. Meade, J. C. Olsen, R. S. Owens, W. L. Savell, J. A. Schaefer and W. W. Scott.)

CONTENTS: Aluminum; Antimony; Arsenic; Barium; Bismuth; Boron; Bromine; Cadmium; Calcium; Carbon; Cerium and Other Rare Earths; Chlorine; Chromium; Cobalt; Copper; Fluorine; Glucinum (Beryllium); Gold; Iodine; Iron; Lead; Magnesium; Manganese; Mercury; Molybdenum; Nickel; Nitrogen; Phosphorus; Platinum; Rarer Elements of the Allied Platinum Metals; Potassium; Sodium and Other Alkalies; Selenium and Tellurium; Silicon; Silver; Strontium; Sulphur; Thorium; Tin; Titanium; Tungsten; Tantalum and Columbium; Uranium; Vanadium; Zinc; Zirconium; Acids; Water Analysis; Oils, Fats and Waxes; Paints; Cement; Special Alloys; Coal; Gas; Assaying of Gold, Silver, etc. Useful Data; Conversion Tables; Table of Melting Points; Acid Tables; Books of Reference.

A compilation of carefully selected methods that have proven of practical value to the professional chemist. The subjects have been presented with sufficient detail to enable one with an elementary knowledge of analytical processes to follow the directions; on the other hand, lengthy exposition, theoretical dissertation and experimental data are purposely avoided, in order to include a large amount of information in a compact accessible form.

SNELL, F. D. Colorimetric Analysis. Ill., 5 x 7.

In Press

CONTENTS: Conditions of Use of Colorimetric Methods; Apparatus Used and Methods of Using It; Figuring of Results; The Determination of Iron; Determination of Copper; Lead, Bismuth and Arsenic; Aluminum and Chromium; Nickel, Cobalt, Manganese and Zinc; Potassium and Magnesium; Gold; Titanium, Vanadium, and Tungsten; Fluorine, Chlorine and Perchlorates; Nitric and Nitrous Acids and Ammonia; Phosphorus, Silica and Boron; Oxygen and Hydrogen Peroxide; Sulphur, Hydrogen Sulphid and Selenious Acid; Color of Water, Oils and Dyes; Nephelometry.

ACIDS, BASES, CHEMICALS

CALVERT, G. T. The Manufacture of Sulphate of Ammonia and Crude Ammonia. *Second Edition, Revised and Enlarged.* 128 ill., 5½ x 8¾, 165 pp. **\$4.00**

CONTENTS: Sulphate of Ammonia, Its Composition and Analysis; The Raw Materials, Ammoniacal Liquor, Sulphuric Acid and Lime; Plant Required for the Manufacture of Sulphate of Ammonia; A Detailed Description of the Apparatus and Processes Used; Starting, Working and Stopping the Plant, Difficulties and Their Remedies; Cost of Manufacture of Sulphate of Ammonia; Manufacture of Crude Ammonia or Concentrated Ammoniacal Liquor; Manufacture of Sulphate of Ammonia in Small Works; Design of a Sulphate of Ammonia House—Comparisons of Ammoniacal Liquors—Sulphuric Acid Table.

DIETERICH, K. Analysis of Resins, Balsams, and Gum Resins: Their Chemistry and Pharmacognosis. With a Bibliography. Translated

from the German by Chas. Salter. $5\frac{3}{4} \times 8\frac{1}{2}$, 340 pp. **\$3.50**

CONTENTS: General Discussion and Exposition; Origin, Habitat, General Properties, Commercial Varieties, Adulterants, Analysis and Bibliography of All Balsams, Resins and Gum Resins.

FALK, K. G. *Chemical Reactions: Their Theory and Mechanism.* *In Press*

CONTENTS: Introduction; Valence; Co-ordination Number; Acids and Bases; Catalysis; Chemical Reactions; General Considerations; Some Chemical Reactions; Olefins and Their Reaction Products; Oxidation—Reduction; Some Oxidation—Reduction Reactions.

FINDLAY, ALEXANDER. *The Treasures of Coal Tar.* Illustrated. $5 \times 7\frac{1}{2}$, 137 pp. **\$2.00**

CONTENTS: The Production of Coal Tar; The Distillation of Coal Tar; The Constituents of Coal Tar and Their Applications in the Raw State; Molecular Architecture; The Production of Dyes from Coal Tar; Azo-Dyes; Anthracene Dyes and Vat Dyes; Indigo and Its Derivatives; Drugs, Perfumes, and Photographic Developers; Explosives.

GESCHWIND, L. *Manufacture of Alum and Sulphates, and the Sulphates and Other Salts of Alumina and Iron.* Trans. by Chas. Salter. 195 ill., $6\frac{1}{4} \times 9\frac{1}{4}$, 390 pp. **\$5.00**

CONTENTS: Theoretical Study of Aluminum, Iron, and Compounds of These Metals; Manufacture of Aluminum Sulphates and Sulphates of Iron; Uses of the Sulphates of Aluminum and Iron; Uses and Applications of Ferrous Sulphate and Ferric Sulphates; Chemical Characteristics of Iron and Aluminum; Analysis of Various Aluminous or Ferruginous Products; Analysing of Aluminum Products.

GROSSMANN, J. *Ammonia and Its Compounds.* Ill., 5×7 , 151 pp. **\$1.50**

CONTENTS: Ammonia; Concentrated Gas-liquor; Liquor Ammoniae; Liquid Ammonia; The Carbonates, Sulphate, Chloride, Nitrate, Phosphate, Sulphides, Fluorides, Sulphocyanide, and Ferrocyanide of Ammonia; Waste Gases and Liquors from the Manufacture of the Sulphate; Ammonia Recovery from Spent Oxide; Tables.

HALE, ARTHUR J. *The Manufacture of Chemicals by Electrolysis.* $5\frac{1}{2} \times 8\frac{1}{2}$. *In Press*

KNOX, JOSEPH. *The Fixation of Atmospheric Nitrogen.* pp. (Van Nostrand's Chemical Monographs.) **\$1.00**

CONTENTS: Fixation of Atmospheric Nitrogen as Nitric and Nitrous Acids, or as Their Salts; Synthesis of Ammonia and Ammonium Compounds from Atmospheric Nitrogen; Conversion of Atmospheric Nitrogen into Compounds Which Readily Yield Ammonia; Bibliography.

KOPPE, S. W. *Glycerine.* Its introduction, uses and examination. For chemists, perfumers, soapmakers, pharmacists, and explosives technologists. 7 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 260 pp. **\$3.50**

CONTENTS: Chemical Properties of Glycerine; Compounds and Decomposition Products of Glycerine; Products and Properties of Glycerine; Nitro-Glycerine; Properties of Nitro-Glycerine; Dynamite; Lead Glycide (Glycerine Cement); Glycerine as a Softening Substance; Preparations of Glycerine and Glue; Glycerine Applied to the Manufacture of Inks; Glycerine as a Solvent; Various Applications of Glycerine; Chemical Analysis of Glycerine; Investigation of Nitro-Glycerine and Dynamite.

KRAUCH, C. *Chemical Reagents, Their Uses, Methods of Testing for Purity and Commercial Varieties.* Translated from the German. *Second Edi-*

tion, Revised and Enlarged, by H. B. Stocks. $5\frac{1}{2} \times 8\frac{1}{2}$. 375 pp. \$7.00
In this edition all the new reagents, such as dimethylglyoxime, nitron, benzidine, etc., have been introduced and their uses described. Much new matter has been added in connection with the older reagents. Temperatures are given in all cases in degrees centigrade, while the whole of the molecular weights have been recalculated from the International Atomic Weights for 1918.

LUNGE, GEORGE. *Coal-Tar and Ammonia. Fifth Thoroughly Revised and Enlarged Edition.* In three volumes, not sold separately. Ill., $5\frac{1}{2} \times 9$. 1600 pp. **\$25.00**

ABRIDGED CONTENTS: *Coal Tar.* Introductory; Processes for Obtaining Coal Tar; The Properties of Coal-Tar and Its Constituents; The Applications of Coal-Tar Without Distillation; The First Distillation of Coal-Tar; Pitch; Anthracene Oil; Creosote Oil; Carbolic Oil (Middle Oil); Light Oil; Working-Up the Light Naphtha into Final Products. *Ammonia.* Historical Notes on Ammonia; Sources from Which Ammonia is Obtained; The Composition and Analysis of Ammoniacal Liquor, and Properties of Its Constituents; The Working-Up of Ammoniacal Liquor into Concentrated Liquor and Liquid Ammonia; Manufacture of Sulphate of Ammonia; Other Technically Important Ammonium Salts.

This new edition will be of great importance, as six years have elapsed since the publication of the fourth edition, which has been out of print for some time. In preparing the revised issue the author is not only embodying in it all the new matter collected by himself on visits to factories and through communications with private sources, but also that which he has found in the books and periodicals published in the various industrial countries, and in the extremely numerous specifications of those countries.

LUNGE, GEORGE. *The Manufacture of Sulphuric Acid and Alkali.* With the collateral branches. A theoretical and practical treatise. In four volumes. (Three now ready.)

Vol. I., Sulphuric Acid. In three parts. Not sold separately. *Fourth Edition.* 543 ill., 11 folding plates, $6\frac{3}{4} \times 9$, 1665 pp.

Reprinting

CONTENTS: Historical and General Notes on the Manufacture of Sulphuric Acid. Raw Materials of the Sulphuric Acid Manufacture, Including Nitric Acid. Properties and Analysis of the Technically Employed Oxides and Acids of Sulphur. Production of Sulphur Dioxide. Construction of the Lead Chambers. Recovery of the Nitrogen Compounds. Chamber-Process. Purification of Sulphuric Acid. Concentration of Sulphuric Acid. Sulphuric Acid Works Arrangement on the Chamber Process. Yields and Costs. Manufacture of Nordhausen or Fuming Oil of Vitriol, and of Sulphuric Anhydride. Other Processes for Manufacturing Sulphuric Acid. By-Products of the Manufacture of Sulphuric Acid. Application of Sulphuric Acid and Statistics. Addenda.

Sulphuric and Nitric Acid. Supplement to Vol. I. *Reprinting*
Ill., 6×9 . 347 pp.

Since the issue of the fourth edition very numerous contributions have been made to the industries described, and in response to numerous requests this material has been compiled and brought up to date in this supplemental volume. The text arrangement is in the form of references to the large book, giving the number of the page in the subject matter of which needed changing or amplification.

Vol. II., Sulphate of Soda, Hydrochloric Acid, Leblanc Soda. *Third Edition, Much Enlarged.* In two parts, not sold separately. 335 ill., $6\frac{1}{4} \times 9$, 1044 pp. *Reprinting*

CONTENTS: Properties and Occurrences in Nature of the Raw Materials and Products of the Alkali Industry and their Analysis; Manufacture of Sulphate

of Soda; from Salt and Sulphuric Acid by the process of Hargreaves and Robinson; Other Methods; Purification of Sodium Sulphate; The Condensation of the Hydrochloric Acid Produced in the Manufacture of Sulphates of Soda; Manufacture of Hydrochloric Acid by Other than Ordinary Methods; Weak Acid; Control of Condensation; Yields, Costs, Purification, Pumping and Conveyance of Hydrochloric Acid; Notes on Alkali; Manufacture Theory of the Leblanc Process; The Manufacture of Black-Ash; Black-ash and Tank Liquor; Manufacture of Finished Soda and Bicarbonate; Yield and Costs; Caustic Soda; Tank Waste.

Vol. III., Ammonia-Soda, Various Processes of Alkali Making and the Chlorine Industry. *Third Edition, Much Enlarged.* Ill., 784 pp.
Reprinting

CONTENTS: THE AMMONIA-SODA PROCESS, HISTORICAL AND GENERAL.—The Ammoniacal Solution of Salt. Production of Carbonic Acid for the Ammonia. Soda Process. Precipitation of Sodium Bicarbonate by the Carbonating Process. Filtering, Drying and Calcining the Bicarbonate. Recovery of the Ammonia. Combination of the Apparatus, Final Products, Costs, Statistics. Other Forms of the Ammonia-Soda Process. Manufacture of Commercial Bicarbonate by the Ammonia-Soda Process. VARIOUS PROCESSES OF THE ALKALI MANUFACTURE. Manufacture of Soda from Cryolite; Directly from Sodium Chloride; from Sodium Sulphate without Previous Reductions to Sulphide; from Sodium Sulphate, after Reduction to Sulphide; from Nitrate of Soda and Feldspar. THE CHLORINE INDUSTRY.—General Notes on Chlorine. Manufacture of Chlorine by Manganese Ore. Utilization of Still-Liquor. Original Weldon Process. The Deacon Process. Other Processes for the Manufacture of Chlorine. Properties and Behavior of the Hypochlorites and of Bleaching-Powder. Manufacture of Bleaching-Powder. Bleach-Liquors and Other Bleaching Compounds. The Chlorates. Appendix of Statistical Data.

Vol. IV. Electrolytic Methods. Edited by Professors Askenasy and Haber.
In Preparation.

McINTOSH, J. G. *Industrial Alcohol.* The production and use of alcohol for industrial purposes, and as a source of motive power. 75 ill., 25 tables, 6 x 9, 260 pp. **\$3.50**

CONTENTS: Alcohol and Its Properties; Continuous Aseptic and Antiseptic Fermentation and Sterilization in Industrial Alcohol Manufacture; Manufacture of Industrial Alcohol from: Beets, Grain, Potatoes; Wine, Spoilt Wine, Wine Marcs and Fruits; Sugar Cane and Sugar Cane Molasses; Plant for Manufacturing Alcohol; Uses of Alcohol in Industries; Manufacture and Uses of Various Alcohol Derivatives; Alcohol for Lighting, Heating and Motive Power.

MURRAY, B. L. *Standards and Tests for Reagent Chemicals.* 6 x 9, about 300 pp. **\$2.00**

A next text filled with the latest and most trustworthy standards of purity for chemicals used in research, analytical, and control laboratories. The following points are covered quite systematically: Name and Common Synonyms; Chemical Formulas; Molecular Weight; Physical Properties, such as Color, Odor, Form, Melting Point, Boiling Point, Congealing Point, Specific Gravity, Solubility and Reaction; Standard of Purity; Uses as a Reagent; Storage and Precautions; Tabular Statement of Maximum of Allowable Impurities; Methods of Testing; Quantitative Methods; References to Literature.

PARTINGTON, J. R. *The Alkali Industry.* 63 ill., 5½ x 8¾, 318 pp. (Industrial Chemistry Series.) **\$3.00**

CONTENTS: Introduction; The Salt Industry; Sulphuric Acid; Natural Soda and the Leblanc Process; The Ammonia-Soda Process; Electrolytic Processes; Chlorine and Derived Products; Nitric Acid; Ammonia and Ammonium Salts;

The Oxidation of Ammonia; Utilization and Economy of Sulphuric Acid; The Potassium Salts, Iodine, Magnesium.

The chief points which the author has kept in view have been to give a concise and connected sketch of the whole subject, and always if possible to give some explanation for the mode of procedure adopted in each case. In this way the book may be regarded as an introduction to, and also as supplementing, the larger and more technical treatises, and that it may also be of some interest to the technical expert who wishes to keep in touch with the recent applications of pure science to the industry.

PRIDEAUX, E. B. R. *The Theory and Use of Indicators.* An account of the chemical equilibria of acids, alkalies and indicators in aqueous solutions, with applications. $5\frac{1}{2} \times 8\frac{1}{2}$, 382 pp. **\$5.00**

CONTENTS: Equilibria of Acids, Bases and Salts, and the Physical Methods of Determining Acidity and Alkalinity; Light Absorption in the Visible Spectrum and Calorimetry; Theories of Color in Their Relation to the Ionic Theory; Chemical Constitution and the Formation of Salts; Color of Indicators as a Function of Hydrion Concentration; Determination and Use of Indicator Constants; Preparation and Use of Solutions of Standard Hydrion Concentration Applications; Course of Neutralization and the Theory of Titration; Solution Equilibrium and Titration of Some Acids; List of Principal Indicators, with Absorption Spectra.

SEIDELL, ATHERTON. *Solubilities of Inorganic and Organic Compounds.* A compilation of quantitative solubility data from the periodical literature. *Second Edition, Enlarged and Thoroughly Revised.* $6\frac{1}{4} \times 9\frac{1}{4}$, 867 pp. **\$7.50**

The material has been collected in all cases where possible directly from the original sources, and all available quantitative solubility data upon inorganic and organic compounds included. Wherever possible all solubility determinations have been calculated to the weight percentage basis and the interpolated values for regular intervals of temperature given. When determinations of the solubility of the same substance are reported differently by two or more investigators, the results are calculated to a common basis, and if a reasonable degree of concordance is found, the average results alone are given, otherwise both or all determinations are included and a note made of the reason therefor. The arrangement of the material is alphabetical according to the customary English name by which the substance is known. An index is provided for those cases where a doubt appears as to which name is preferable, and also to furnish cross references to the tables containing results upon more than one substance. For the benefit of those who need quantitative solubility data only rarely and are more or less unfamiliar with the usual methods of expressing such data, a detailed description is given of the various forms of stating solubilities and of the methods of calculating results from one form to another. The principles followed in constructing the tables are described and the exact meaning of the results contained in a number of typical tables explained. Finally, there is given a chapter on methods for the quantitative determination of solubility.

VINCENT, C. *Ammonia and Its Compounds: their Manufacture and Uses:* Translated by M. J. Salter. 32 ill., $6\frac{1}{2} \times 10$, 122 pp. **\$2.50**

CONTENTS: General Considerations; Extraction of Ammoniacal Products from Sewage; Extraction of Ammonia from Gas Liquor; Manufacture of Ammoniacal Compounds from Bones, Nitrogenous Waste, Beetroot Wash and Peat; Manufacture of Caustic Ammonia and Ammonium Chloride, Phosphate and Carbonate; Recovery of Ammonia from Ammonia-Soda Mother Liquor.

WARNES, ARTHUR R. *Coal Tar Distillation and Working Up of Tar Products.* *Second Edition, Revised and Enlarged.* 78 ill., 2 folding plates, $5\frac{1}{2} \times 8\frac{1}{2}$, 315 pp. **\$5.00**

CONTENTS: Coal Tar and Its Composition; Effect of Nature of Raw Material and Heat of Carbonisation of Physical Properties and Chemical Composition of Tar; Results of Practical Distillations; Coalite Tar; Vertical Retort Tar; Increasing Toluene in Tar; "Free Carbon" of Tar; How Tar is Received from Gasworks; Tar Tips; Storage of Tar; Construction of Storage Tanks; Pumps; Tar Mains; Plant Used in the Distillation of Tar; Distillation of Coal Tar; Plant for Recovering Cresylic and Carbolic Acids from Oils; The Recovery of Carbolic and Cresylic Acids; Plant for the Recovery of Benzols, Naphthas; The Recovery of Benzols and Naphthas; First Distillation and Washing; The Rectification of Benzols and Naphthas; Plant for the Working Up of Pyridine from Pyridine Acid; The Recovery and Rectification of Pyridine Bases; Plant for the Manufacture of Crude Naphthalene and Anthracene; The Manufacture of Crude Naphthalene and Anthracene; Pitch and Pitch "Getting"; Creosote; Gas Stripping; Tarworks' Tests; Appendix.

WREN, HENRY. *The Organometallic Compounds of Zinc and Magnesium.* 5¼ x 7½, 108 pp. (Van Nostrand's Chemical Monographs.) **\$1.00**

CONTENTS: General Notes on Grignard's Reaction; Products Formed by the Aid of Grignard's Reagents; Theoretical; Zinc Organometallic Compounds; Bibliography.

CERAMICS AND GLASS

ASCH, W., and ASCH, D. *The Silicates in Chemistry and Commerce.* Including the exposition of a hexite and pentite theory and of a stereochemical theory of general application. Translated, with critical notes and additions, by Alfred B. Searle. Ill., 6¾ x 10, 476 pp. **\$7.50**

CONTENTS: Chemistry of Carbon and Silicon; Historical Review of Existing Theories Concerning the Constitution of the Alumino-Silicates and Other Silicates; Critical Examination of Existing Theories Concerning Alumino-Silicates; Hypothesis Concerning the Bonding of the Atoms in Alumino-Silicates and Allied Compounds. *Consequences of the "Hexite-Pentite Theory" and the Facts.* Reactions During Double Decomposition; Genetic Relationship Between Various Aluminosilicates; Possibility of a Chemical System of Aluminosilicates; Variable Chemical Behaviour of Part of the Aluminum in Kaolin, Nepheline, and in the Epidotes; Minimum Molecular Weight of Aluminosilicates; Constitution of Andesite; Possibility of Isomerism; Water of Crystallisation and of Constitution; Basic and Acid Water; Prognoses; Constitution of the Complexes of Molybdenum and Tungsten; Constitution of Clays; Ultramarines; New Theory of Hydraulic Binding Materials and Particularly of Portland Cements; Of the Porcelain Cements as Used for Dental Fillings; Of Glass, Glazes and Porcelain; Hexite-Pentite Theory as a General Theory of Chemical Compounds; Conversion of the H.-P. Theory Into a Stereochemical Theory and the Combination of the Latter with the Modern Theory of the Structure of Crystals; Summary and Conclusions; Bibliography; Appendix Formulas and Analyses.

AUDLEY, J. A. *Silica and the Silicates.* 5½ x 8¾. (Industrial Chemistry Series.) *In Press*

BECKWITH, A. *Pottery,* Observations on the materials and manufacture of terra-cotta, stoneware, firebrick, porcelain, earthenware, brick, majolica, and encaustic tiles. 5¾ x 9, 101 pp. **\$0.60**

CONTENTS: Porcelain; Parian; Earthenware; Decorative Tiles; Terra Cotta; Stoneware; Terro-Metallic Ware; Blue Bricks; Fire-Clay Wares; Bricks; Drain Pipes; Roofing Tiles; Ancient Architectural Pottery.

BINNS, C. F. *Manual of Practical Potting.* Compiled by experts. *Third Edition, Revised and Enlarged.* 5¾ x 8¾, 304 pp. **\$8.00**

CONTENTS: Bodies; Glazes; Gold and Gold Colors; Means and Methods; Classification and Analysis; Forms and Tables.

BOURRY, EMILE. *A Treatise on Ceramic Industries.* A complete manual for pottery, tile, and brick manufacturers. A revised translation from the French by Albert B. Searle. *New Edition in Press*

CONTENTS: Definition and Classification of Ceramic Ware; Brief History of Ceramics; Raw Materials of Bodies; Plastic Bodies—Properties and Composition, Preparation, Purification; Processes of Formation: Throwing, Expression, Moulding, Pressing, Casting, Slipping; Drying: Evaporation, Aeration, Heat, Absorption; Glazes: Manufacture and Application; Firing: Properties of Bodies and Glazes During Firing—Kilns; Decoration: Materials and Methods; Terra-cottas: Bricks, Hollow Blocks, Roofing, Tiles, Paving Bricks, Pipes, Architectural and Decorative Terra-Cotta, Common Pottery, Tobacco Pipes, Lustre Ware, Tests; Fireclay Goods: Varieties, Methods of Manufacture, Tests; Faïences: Classification, Composition, Methods of Manufacture and Decoration; Stoneware: Paving Tiles, Sanitary Ware, for Domestic Purposes, For Chemical Products, Decorative Objects; Porcelain: Classification, Composition, Manufacture, Decoration.

DUTHIE, ARTHUR LOUIS. *Decorative Glass Processes.* 38 ill., 6 x 9, 279 pp. (Van Nostrand's Westminster Series.) **\$2.50**

CONTENTS: Preface; Introduction; Various Kinds of Glass in Use: Their Characteristics, Comparative Price, etc.; Leaded Lights; Stained Glass; Embossed Glass: Brilliant Cutting and Bevelling; Sand-Blast and Crystalline Glass; Gilding, Silvering, and Mosaic; Proprietary Processes; Patents; Glossary; Index.

FAIRIE, J. *Notes on Pottery Clays.* The distribution, properties, uses and analysis of ball clays, china clays and china stone. With tables and formulæ. 5¼ x 7½, 135 pp. **\$2.00**

CONTENTS: Properties of Clays; Brick; Fire; Pottery; Pipe; Dorsetshire and Devonshire; Kooehn or China; Cornish China; Analysis of Clays; Preparation of Clays; Sources of Irish Porcelain Clays; China Stone, Its Discovery, Use, Composition, Occurrence and Analysis.

MALINOVZSKY, A. *Analysis of Ceramic Materials and Methods of Calculation.* *In Press*

Recipes for FLINT GLASS MAKING. Being leaves from the mixing book of several experts on the flint glass trade, compiled by a British glass master and mixer. 5¼ x 7½, 34 pp. **\$5.00**

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RHEAD, G. W. *British Pottery Marks.* Ill., 5½ x 8½, 307 pp. **\$3.50**

Of assistance to the collector, connoisseur, student, and general reader in the identification of the various British pottery wares. Illustrated with fourteen half-tones and more than twelve hundred pottery marks in the text.

ROSENHAIN, WALTER. *Glass Manufacture.* Ill., 6 x 8½, 264 pp. **\$5.00**

CONTENTS: Physical and Chemical Properties; The Raw Materials of Glass Manufacture; Crucibles; Furnaces for the Fusion of Glass; Process of Fusion; Processes Used in the Working of Glass; Bottle Glass; Blown and Pressed; Rolled or Plate; Sheet and Crown; Colored; Optical; Miscellaneous Products; Appendix.

SANDEMAN, ERNEST A. *Notes on the Manufacture of Earthenware.* Ill., 5 x 7½, 390 pp. **\$3.50**

CONTENTS: Definition of Earthenware and General Principles of Its Manu-

facture; Materials Used in the Composition of the Body; Mixture of the Materials for the Body in the Slip House; Materials and Their Preparation for the Glaze; Models and Moulds; Processes and Materials Used in Their Manufacture; Manufacture of Articles from Clay and Various Methods Employed; Pressing, Casting, Handling, Sticking-up Dishmaking; Application of Machinery to Potting; Auxiliary Plant and Appliances Required by Machine Jiggerers; Manufacture of Clay Ware by Machinery; Decoration of Ware in the Clay State; General Remarks on Clay Ware; Ovens and Their Construction; Saggers and Sagger-making; Biscuit Placing; Firing; Drawing Biscuit Ovens and Biscuit Warehouse; Dipping, or the Application of the Glaze; Spurs, Thimbles, Stilts, and Their Manufacture; Glost Placing or the Arrangement of Glazed Ware in Saggers; Glost Firing; Drawing Glost and Sorting Warehouse; Printing Underglaze; Painting and Decorating Underglaze; Hardening-on Kilns; Printing, Painting and Decorating Overglaze; Enamel Kilns and Firing; Glost Warehouses and Getting up Orders; The Packing Shed; Arrangement of a Pottery; General Remarks; Cost of Production.

SEARLE, ALFRED B. *Modern Brickmaking.* 260 ill., $6\frac{1}{4} \times 10$, 449 pp.
New Edition in Press

CONTENTS: The Nature and Selection of Clays; Their Special Suitability for Certain Purposes; The Colors and Characteristics of Various Bricks: Sand, Breeze and Other Materials Used; The General Manufacture of Bricks; Hand-Brickmaking Processes; Plastic Moulding by Machinery; Wire-Cut Bricks; Mixers and Feeders; Expression Rolls; Pug-Mills, Mouthpiece Presses and Auger Machines; Cutting Tables; Represses; Dryers; The Stiff-Plastic Process; The Semi-Dry or Semi-Plastic Process: The Dry or Dust Process; Kilns-Setting and Burning; Vitrified Brick for Special Work; Fire-Bricks and Blocks; Glazed Bricks; Perforated, Radial, and Hollow Bricks and Blocks; Fire-proof Flooring; Moulded and Ornamental Bricks; Drying Raw Clay; Sources of Difficulty and Loss.

A complete treatise on the whole industry, in which is condensed into convenient limits the results of a wide practical experience with all the better known processes, machines and kilns now in use.

SEARLE, A. B. *Cement, Concrete and Bricks.* 113 illus., $5\frac{1}{2} \times 8\frac{1}{4}$, 415 pp.
\$3.00

CONTENTS: The Raw Materials for Cements; Methods of Cement Manufacture; Chemical and Physical Changes in Cements; Changes That Occur in Setting and Hardening; Testing the Properties of Cements; The Components of Concrete and Their Properties; Preparation of Concrete; Reinforced Concrete; Special Properties of Concrete; Testing Concrete; Raw Materials for Bricks; Methods of Brickmaking; The Chemical and Other Changes in Drying and Burning Bricks; Basic and Neutral Bricks.

Attempts to show the intimate relationships which exist between cement and bricks (with concrete as a relative of both), and at the same time to indicate some of the directions in which a further study of these materials will be likely to prove of value.

SHAW, S. *Chemistry of the Several Natural and Artificial Heterogeneous Compounds Used in Manufacturing Porcelain, Glass and Pottery.* Re-issued in its original form as published in 1837. $6\frac{1}{2} \times 10$, 769 pp. **\$6.00**

CONTENTS: *Analysis and Materials.* Elements; Temperature; Acids and Alkalies; The Earths; Metals. *Synthesis and Compounds.* Origin and Progress of the Art; Science of Mixing; Various Bodies; Glazes; Glasses; Colors; Tables of the Characteristics of Chemical Substances.

SHAW, S. *History of the Staffordshire Potteries and the Rise and Progress of the Manufacture of Pottery and Porcelain.* With references to genuine specimens, and notices of eminent potters. $6 \times 8\frac{3}{4}$, 269 pp. **\$2.50**

CONTENTS: The Potteries; On the Origin of the Art, and Its Practice Among the Early Nations; Manufacture of Pottery Prior to 1700; Introduction of Red Porcelain in 1690; Progress of the Manufacture from 1700 to 1760; Introduction

of Fluid Glaze; Introduction of Porcelain; Blue Printed Pottery; Introduction of Lustre Pottery.

SUFFLING, E. R. *Treatise on the Art of Glass Painting.* Prefaced with a review of ancient glass. Ill., colored plates, cloth, 150 pp. **\$3.50**

CONTENTS: A Short History of Stained Glass; Designing Scale Drawings; Cartoons and Cutline; Various Kinds of Glass Cutting for Windows; Colors and Brushes Used in Glass Painting; Painting on Glass; Dispersed Patterns; Diapered Patterns; Aciding; Firing; Fret Lead Glazing.

OILS, FATS AND WAXES

ANDES, L. E. *Animal Fats and Oils.* Their practical production, purification and uses for a great variety of purposes; their properties, falsification and examination. Translated from the German by Charles Salter. *Second Edition, Enlarged.* 62 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 259 pp. **\$5.00**

CONTENTS: Introduction; Occurrence, Origin, Properties, and Chemical Constitution of Animal Fats; Preparation of Animal Fats and Oils; Machinery for Breaking Down Fats; Pans and Apparatus for Fat Melting; Tallow-Melting Plants; Presses; Filtering Apparatus; Animal Fats and Oils; Raw Materials, Preparation, Properties and Uses; Butter, Raw Material and Preparation; Artificial Butter: Oleomargarin; Hog's Lard: Raw Material; Lard Oil; Beef Marrow; Tallow; Beef Tallow, Raw Material; Bone Fat; Bone Oil; Neatsfoot Oil; Horse Fat; Animal Oil; Keppel's Oil; Fish Oils; Seal Oils; Liver Oils; Artificial Train Oil; Turtle, Candle-Fish, Crocodile, and Alligator Oils; Hare, Goose and Human Fat; Degras; Tanner's Grease; Wool Fat; Examination of Fats and Oils in General.

ANDES, LOUIS E. *Vegetable Fats and Oils.* Their practical preparation, purification, properties, adulteration and examination. Translated from the German by Chas. Salter. *Third Edition, Revised and Enlarged,* by H. B. Stocks. 93 ill., $5\frac{1}{2} \times 8\frac{3}{4}$, 362 pp. **\$6.00**

CONTENTS: Introduction; General Properties and Composition of the Vegetable Fats and Oils; Estimation of the Amount of Oils in Seeds; Non-Drying Vegetable Oils; Semi-Drying Vegetable Oils; Vegetable Drying Oils; Solid Vegetable Fats; The Preparation of Vegetable Fats and Oils; Installation of Oil and Fat Works, and the Apparatus Used for Grinding, Pressing and Extracting; Treatment of the Oil After Leaving the Press; Refining with Sulphuric Acid, Zinc, Lead, Oxides, Alkalies and Tannin; Ekenberg and Aspinall's Method of Refining Oils; Purifying Oils and Mechanical Appliances for Refining; Deodorising Oils and Fats; Bleaching Fats and Oils; Practical Experiments on the Treatment of Oils, with Regard to Refining and Bleaching; Oils Specially Prepared for Industrial Purposes; The Hydrogenation of Oils for Conversion into Solid Fats; Oil-Cake and Meal; Physical and Chemical Examination of Oils and Fats.

ANDES, L. E. *Drying Oils, Boiled Oil, and Solid and Liquid Driers.* A practical work for manufacturers of oils, varnishes, printing inks, oil cloth and linoleum, oil cakes, paints, etc. *Second Edition.* Revised by H. B. Stocks. 43 ill. and diagrams, $5\frac{3}{4} \times 8\frac{3}{4}$, 352 pp. **\$6.00**

CONTENTS: General Chemical and Physical Properties of the Drying Oils—Cause of the Drying Property—Absorption of Oxygen—Behaviour Towards Metallic Oxides, etc.; The Properties of and Methods for Obtaining the Drying Oils; Production of the Drying Oils by Expression and Extraction, Refining and Bleaching; Manufacture of Boiled Oil; The Preparation of Drying Oils for Use in the Grinding of Paints and Artists' Colours and in the Manufacture of Varnishes, by Heating (Boiling) Over a Fire or by Steam by the Cold Process, by the Action of Air, and by Means of the Electric Current; Preparation of Varnishes for

Letterpress Lithographic, and Copper-Plate Printing; For Oilcloth and Waterproof Fabrics; Behaviour of the Drying Oils and Boiled Oils Towards Atmospheric Influences, Water Acids, and Alkalis; Boiled Oil Substitutes; Manufacture of Solid and Liquid Driers from Linseed Oil and Rosin; Examination of the Drying Oils and Boiled Oils and Driers for Adulteration.

ANDES, L. E. *Oil Colors and Printers' Ink.* A practical handbook treating of linseed-oil, boiled oil, paints, artists' colors, lampblack, and printers' inks (black or colored). Translated from the German. *Second Edition, Revised and Enlarged*, by H. B. Stocks. 57 ill., 6 x 9, 235 pp. **\$4.00**

CONTENTS: Linseed Oil; Poppy Oil and Walnut Oil; Mechanical Purification of Linseed Oil; Chemical Purification of Linseed Oil; Bleaching Linseed Oil; Oxidising Agents for Boiling Linseed Oil; Theory of Oil Boiling and Drying; Manufacture of Boiled Oil; Adulterations of Boiled Oil; Chinese Drying Oil and Other Specialties; Pigments for House and Artistic Painting and Inks; Pigments for Printers' Black Inks; Substitutes for Lampblack; Machinery for Color Grinding and Rubbing; Machines for Mixing Pigments with the Vehicle; Paint Mills; Manufacture of Ordinary Oil Paints; Examination of Pigments and Paint; Ship Paints; Luminous Paint; Artists' Colors; Printers' Inks; Vehicles; Pigments and Manufacture.

BRUNNER, R. *Manufacture of Lubricants, Shoe Polishes and Leather Dressings.* Such as axle and machinery greases, oils, machinery oils, clockmakers' oils, as well as shoe polishes. Translated from the *Sixth* German edition by Charles Salter. Ill., 5 x 7½, 170 pp. **\$3.50**

CONTENTS: Properties of Lubricants; Raw Materials; Lubricants of: Tallow, Palm Oil, Lead Soap, True Soap, Caoutchouc; Oils for Lubricating Made of Fat and Resin, Neatsfoot Oil, Bone Fat; Mineral Oils; Clockmakers' and Sewing Machine Oils; Use of Lubricants; Shoe Polishes; Leather Varnishing and Softening Preparations; Bone Black; Dégras.

CHALMERS, T. W. *The Production and Treatment of Vegetable Oils.* Including chapters on the refining of oils, the hydrogenation of oils, the generation of hydrogen, soap making, the recovery and refining of glycerine, and the splitting of oils. 95 illustrations, 9 folding plates. 7 x 10, 163 pp. **\$7.50**

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ELLIS, CARLETON. *The Hydrogenation of Oils, Catalyzers and Catalysis, and the Generation of Hydrogen and Oxygen.* *Second Edition, Thoroughly Revised and Enlarged:* 240 ill., 6 x 9, 767 pp. **\$7.50**

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Decomposition of Hydrocarbons; Hydrogen by the Action of Steam on Heated Metals; Action of Acids on Metals; Miscellaneous Methods of Hydrogen Generation; Hydrogen and Oxygen by Electrolysis of Water; Precautions in Handling Hydrogen; Appendices.

Heretofore, the literature on hydrogenation has been scattered through many periodicals, and except for a few condensed briefs, has not found its way into book form. In this work the author has collected and arranged in logical order all the known facts and figures of this important new branch of chemistry. The treatise describes the numerous processes proposed for the treatment of various oils with hydrogen, and gives many details of operation on the large scale. The catalytic materials employed and the manner of preparation are discussed fully, and all useful methods of generating hydrogen gas are detailed. The publication is one which should be of great interest to workers in fatty and petroleum oils, and in fact in all arts where the treatment of unsaturated organic compounds is involved. While entering into the scientific side of the process in a thorough manner, the treatment of the subject from the standpoint of the practical operator is exceptionally well considered.

ENNIS, WILLIAM D. *Linseed Oil and Other Seed Oils.* An industrial manual. 88 ill., $6\frac{1}{2} \times 9\frac{1}{2}$, 330 pp. **\$5.00**

CONTENTS: Introductory. The Handling of Seed and the Disposition of Its Impurities; Grinding. Tempering the Ground Seed and Moulding the Press Cake. Pressing and Trimming the Cakes. Hydraulic Operative Equipment. The Treatment of the Oil from the Press to the Consumer. Preparation of the Cake for the Market. Oil Yield and Output. Shrinkage in Production. Cost of Production. Operation and Equipment of Typical Mills. Other Methods of Manufacturing. The Seed Crop. The Seed Trade. Chemical Characteristics of Linseed Oil. Boiled Oil. Refined and Special Oils. The Linseed Oil Market. The Feeding of Oil Cake. Miscellaneous Seed Oils. The Cotton-seed Industry; Glossary.

The book is clearly written, and is noticeable for the free use of simple mathematical formulæ to exactly express the working of operations and conditions. Precise figures are almost everywhere given, and the treatise is the most complete and exhaustive on the subject which has yet appeared.

FRIEND, J. NEWTON. *The Chemistry of Linseed Oil.* 86 $\frac{2}{1} \times 5$ (Van Nostrand's Chemical Monographs.) **\$1.00**

CONTENTS: Introduction; The Manufacture of Linseed Oil; The Chief Constituents of Linseed Oil; Properties and Reactions of Linseed Oil; The Chemistry of Linseed Oil and Linoxyn; Polymerised and Oxidised Oils; Bibliography and Notes.

explained. 58 ill., $5\frac{3}{4} \times 8\frac{1}{4}$, 324 pp. **\$2.00**

GREGORIUS, R. *Mineral Waxes, Their Preparation and Uses.* Trans. by C. Salter. 32 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 247 pp. **\$3.00**

CONTENTS: Ozokerite and Ceresine; Paraffin; Mineral (Montan) Wax; Various Appliances for Extracting, Distilling, and Refining Ozokerite, Etc.; Uses of Ceresine, Paraffin, and Mineral Wax.

HURST, GEORGE H. *Lubricating Oils, Fats and Greases.* Their origin, preparation, properties, uses, and analysis. *Third Edition, Revised and Enlarged*, by Henry Leask. 74 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 405 pp. **\$5.00**

CONTENTS: Introduction. Hydrocarbon Oils. Scotch Shale Oils. Petroleum. Vegetable and Animal Oils. Testing and Adulteration of Oils. Lubricating Greases. Lubrication: Under Ordinary Atmospheric Conditions; at High Temperatures; of Internal Explosion Engines. Tables and Recipes.

HYDE, FREDERIC S. *Solvents, Oils, Gums, Waxes and Allied Substances.* $5\frac{1}{4} \times 8\frac{1}{2}$, 182 pp. **\$2.00**

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These notes are intended for the use of factory chemists and others who may desire a short reference book on commercial organic products. The subject-matter has been compiled from various sources and purposely condensed to render it the more accessible. Reference is made to well-known authorities throughout the text. Only those methods and tests which seemed reliable in the hands of the writer have been selected, limiting the descriptions to the salient features in each case.

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SCHEITHAUER, W. Shale Oils and Tars and Their Products. Translated from the German by Chas. Salter. 74 ill., 5¾ x 8¾, 190 pp. **\$4.00**

CONTENTS: History of the Shale and Lignite-Tar Industry; Bituminous Raw Materials; Production of Distillation Tar; Distillation Products; Distillation of the Tar and Tar Oils; Chemical Treatment of the Tar and Its Distillates; Utilization of Refinery Waste; Manufacture of Paraffin; Products Furnished by Shale Oil and Lignite Tar; Candlemaking; Chemical Composition of the Tars and Their Distillates; Laboratory Work; Statistics.

SHERRIFF, FRANK F. The Oil Merchants' Manual and Oil Trade Ready Reckoner. *Second Edition, Revised and Enlarged.* 5½ x 8½, 215 pp. **\$3.50**

SIMMONS, W. H. Fats, Waxes and Essential Oils. 5½ x 8¾. (Industrial Chemistry Series.) *In Press*

SIMMONS, W. H., and MITCHELL, C. A. Edible Fats and Oils. Their composition, manufacture and analysis. Ill., 5¾ x 8¾, 164 pp. **\$3.50**
(Mr. Simmons is lecturer on soap manufacture at the Battersea Polytechnic.)

CONTENTS: Raw Materials Used in the Manufacture, Refining, Bleaching and Deodorizing; Butter; Lard; Margarine and Other Butter Substitutes; Salad Oils; Analysis of Raw Materials and Finished Products; Statistics of the Trade in Edible Oils.

SOUTHCORBE, J. E. Chemistry of the Oil Industries. Ill., 6 x 9, cloth, 209 pp. (Outlines of Industrial Chemistry.) **\$3.50**

CONTENTS: Introductory Organic Chemistry. Mineral Oils. Petroleum and Shale-Mineral Oil Refining. Natural Sources and Methods of Preparation of Saponifiable Oils and Fats. Impurities Occurring in Crude Oils and Fats and the Technical Methods of Removing Them. Composition and Properties of the Saponifiable Oils and Fats in General. Composition and Properties of the Individual Oils and Fats of Commercial Importance. The Natural Waxes, Their Composition and Properties. Analytical Methods. Industrial Applications of Fats and Oils. Burning Oils. Edible Oils and Margarines. Polymerised, Boiled and Blown Oils. Turkey-Red Oils. Saponification of Fats and Oils on a Technical Scale. The Distillation of Fatty Acids. Oleines and Stearines. Candle Manufacture. Soap-Making. Glycerine. Conclusion. Scientific and Technical Research on Problems in the Oil and Related Industries. Literature.

PAINTS, COLORS, VARNISHES

ANDES, LOUIS E. Iron Corrosion, Anti-Fouling and Anti-Corrosive Paints.

Translated from the German by Charles Salter. *Second Edition*, revised and enlarged by H. B. Stocks. 62 ill., $5\frac{1}{2} \times 8\frac{3}{4}$, 308 pp. **\$6.00**
CONTENTS: See page 131.

BERSCH, J. Manufacture of Mineral and Lake Pigments. Containing directions for the manufacture of all artificial artists' and painters' colors, enamel colors, soot and metallic pigments. Translated from the *Second Revised Edition* by Arthur C. Wright. 43 ill., 476 pp. **\$6.00**

CONTENTS: Physico-chemical Behavior of Pigments; Raw Materials Used in the Manufacture of Pigments; Assistant Materials; Metallic Compounds; The Manufacture of Various Mineral Pigments; Manufacture of Pigments of Organic Origin; Water Colors; Crayons; Confectionery Colors; Preparation of Pigments for Painting; Examination of Mineral Pigments; Examination of Lakes; Testing Dye Woods; Design of a Color Works; Commercial Names of Pigments.

FLEURY, P. The Preparation and Uses of White Zinc Paints. Translated from the French by Donald Grant. 32 tables, $5 \times 7\frac{1}{2}$, 179 pp. **\$3.00**

CONTENTS: Painting on Woodwork. Better Class Painting on Woodwork Painting on Plaster, on Mortar, and on Soft and Porous Ceilings; Hints on Painting with White Zinc; Testing Commercial Zinc Whites; The Experiments on the Dutch Commission Officially Entrusted to Make Comparative Trials between White Lead and White Zinc; Results and Criticisms of the Experiments of the Dutch Commission; Final Report of October 5, 1909; Manufacture and Different Treatments of White Zinc—Its Modifications and Improvements; The Legislative History of White Zinc Paint; Legislation. *Methods of Qualitative Analysis.* Examination of Paints; Fixed and Essential; Oils; Waxes; Formula for Encaustic and Waterproof Paints; Analysis of Paints; White Paints; White Lead and White Zinc; Blacks; Red Pigments; Carmine and Lakes; Yellow Colors; Green and Blue Pigments; Brown Colors; Binders or Liquids; Testing Preservation and Improvement of Varnishes by Aging; Analysis of Yellow and White Wax; Selected Furniture Polish Recipe. Normal Polish for Floors, Parquets and Woodwork; Virgin Wax Polish for Flatting of Paints or Polishing of Varnishes; Formula for a Waterproof Composition for Plaster and Stone and Damp Walls; Special and More Economical Formula for Waterproofing Plaster.

FURNELL, J. Students' Handbook of Paints, Colors, Oils and Varnishes.

Ill., $5\frac{1}{4} \times 7\frac{3}{4}$, 94 pp.

Reprinting

CONTENTS: Plant Necessary for Making Lemon and Middle Chromes; Chromes; The Making of Chinese, Prussian, and Other Blue Pigments; The Making of Emerald Green and Its Substitutes; Earth Colors or Pigments; Brown and Black Pigments; Reds; Lakes; Lead Compounds; White Pigments; Barytes and Whitening; Painter's Oils; Turpentine; Oil Varnishes; Spirit Varnishes, Polishes and Stains; Liquid Paints; Enamel Paints; Questions.

GARDNER, HENRY A. Paint Researches and Their Practical Applications.

155 ill., 6×9 , 363 pp.

\$5.00

(Author is Director Scientific Section, Paint Manufacturers Association of the U. S., Assistant Director the Institute of Industrial Research, Washington, D. C.)

CONTENTS: Growth of the Prepared Paint Industry and Its Relation to the Work of the Painter; White Pigment Industry; Physical Characteristics of Pigments and Paints; Tests of Lithopone; Washington Paint Oil Tests; Paint Protection for Portland-Cement Surfaces; Paints to Prevent Electrolysis in Concrete Structures; Paints for Metal; Marine Paints; Arlington Paint Tests; Observations on Painted Lumber; Impregnated Panel Tests; Fire Retardant Paints for Shingles and Other Wooden Structures; Composition of Paint Vapors; Toxic and

Antiseptic Properties of Paints; Light-Reflecting Values of White and Colored Paints; Formation and Inhibition of Mildew in Paints; Fungi on Painted Surfaces; Changes Occurring in Oils and Paste Paints, Due to Autohydrolysis of the Glycerides; Effect of Pigments Upon the Constants of Linseed Oil; Storage Changes in Vegetable and Animal Oils; Paint Dryers and Their Application; Miscellaneous Oil Investigations; Application of Paints and Finishes to Wood. This collected information represents the results of many years of careful investigation to determine the usefulness of various materials which find employment in the manufacture of paint and will serve as a guide to those desiring to be abreast of the work on the technology of paint.

HALL, C. H. *Chemistry of Paints and Paint Vehicles.* Ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 140 pp. \$2.00

CONTENTS: Determination of the Elementary Constituents of Paints; Raw Materials; Properties, Tests, and Methods of Analysis; Analysis of Dry Colors, Pastes, and Liquid Paints; Matching of Samples; *Paint Vehicles.* Oils, Varnishes, Japans and Driers; Thinners.

The author has attempted to sift from the great mass of analytical chemistry those methods which apply particularly to the analysis of paints, at the same time calling attention to the most important physical characteristics of the raw materials. This book, being written from the standpoint of a chemist, employed in the manufacture of paints and colors, the chapter on Matching Samples has been included in an attempt to bridge the space between the laboratory and the factory. It is here that so often the results of previous analysis are rendered worthless by being placed in the hands of one who does not understand their interpretation nor the composition of the raw materials which he is using.

HOFF, J. N. *Paint and Varnish Facts and Formulas.* A handbook for the maker, dealer, and user of paints and varnishes. Containing over 600 recipes. 6×9 , cloth, 179 pp. \$2.00

CONTENTS: White Paints and Pigments; The Oxides of Iron; The Chemical Colors; Classification of Pigments; Colors in Oil, Japan and Water; Oils and Solvents; Varnishes; Ready Mixed Paints; Kalsomines; Paint and Varnish Troubles and Their Remedies; Painting and Decorating; Formulas.

HURST, G. H. *Dictionary of Chemicals and Raw Products Used in the Manufacture of Paints, Colors, Varnishes and Allied Preparations.* *Second Edition, Revised and Enlarged*, by H. B. Stocks. $6 \times 8\frac{3}{4}$, 378 pp. \$5.00

JENNINGS, ARTHUR S. *Commercial Paints and Painting.* A handbook for architects, engineers, property owners, painters and decorators, etc. $5\frac{3}{4} \times 8\frac{1}{2}$, 236 pp. (Van Nostrand's Westminster Series.) \$2.50

CONTENTS: Object of Painting; Durability of Paint; Cost of Cheap and Superior Paints Compared; Cost of Keeping Property Painted; Specifying Paints; The Materials Used in Painting; Conditions which Determine the Economic Value of the Paint; Simple Tests for Painters' Materials; The Paint Most Suitable for Different Surfaces; How Paint and Varnish Should be Applied; Paint and Color Mixing; Tools and Plant; Defects in Painters' Work; Specifications for Painters' and Decorators' Work; Painting by Mechanical Means.

JENNISON, F. H. *The Manufacture of Lake Pigments from Artificial Colors.* A useful handbook for color manufacturers, dyers, color chemists, paint manufacturers, dyesalters, wallpaper-makers, enamel and surface-paper makers. *New Edition in Press*

CONTENTS: The Groups of the Artificial Coloring Matters; Nature and Manipulation of Artificial Colors; Lake Forming Bodies for Acid Colors; Lake Forming Bodies' Basic Colors; Lake Bases; Principles of Lake Formation;

Red, Orange, Yellow, Green, Blue, Violet and Black Lakes; Insoluble Azo Colors; Washing, Filtering and Finishing; Matching and Testing.

JONES, M. W. *The Testing and Valuation of Raw Materials Used in Paint and Color Manufacture.* 5 x 7½, cloth, 88 pp. \$2.50

CONTENTS: Compounds of: Aluminum; Iron; Potassium; Chromium; Tin; Copper; Lead; Zinc; Arsenic; Antimony; Calcium; Barium; Cadmium; Mercury; Cobalt; Carbon; China Clay; Ultramarine; Oils.

McINTOSH, J. G. *Manufacture of Varnishes and Kindred Industries.* Based on and including the "Drying Oils and Varnishes," of Ach. Livache. (In Three Volumes.)

Vol. I. *The Crushing, Refining and Boiling of Linseed Oil and Other Varnish Oils. Third Edition, Revised and Enlarged.* 114 ill., 5½ x 8½, 506 pp. \$7.00

CONTENTS: Historical Note; Properties of Drying Oils; Production of Linseed Oil; Composition of Linseed Oil; Refining and Bleaching Linseed Oil; Chemical Reaction of Linseed Oil; Linseed Oil Fatty Acids; Testing of Linseed Oil; The Physical Properties of Linseed Oil; The Adulteration of Linseed Oil; The Technical Chemistry of Linseed Oil; Technical Chemistry of Linseed Oil and the Manufacture of Blown Oils and Linoleum; The Technical Chemistry of Linseed Oil; Time of Drying and Chemistry of Drying Process; Boiled Oil; Durability of Paint; Drying Oils Other Than Linseed Oil.

Vol. II., *Varnish Materials and Oil Varnish Making.* Ill., 5¾ x 8¾, cloth, 216 pp. *Reprinting*

CONTENTS: Amber and Amber Oil Varnishes; Asphaltum; Coal Tar, Bone and Stearine Pitch; India Rubber; Gutta Percha; Paraffin Wax; Cleaning, Assorting and Fusing Resins; Oil Varnish Making; Copal Oil Varnishes; Kauri Copal Varnishes; Brunswick Black; Super Black Japan; Testing Varnish; Utilization of Residues; Utilization of Varnish Makers' Waste Products.

Vol. III., *Spirit Varnishes and Spirit Varnish Materials.* 64 ill., 5½ x 8¾, 492 pp. *Reprinting*

CONTENTS: Solvents. Characteristics of Spirit Varnish Solvents. Sources Preparation, and use of Various Solvents. Alcohol, Ether, and Ethereal Salts, OLEO-RESINOUS PINE PRODUCTS—TERPENES—CAMPHORS. The Oleo-Resiniferous Conifers. Sources and Methods of Obtaining Turpentine. Distillation of Turpentine. Testing and Substitutes, Distillation and Chemistry of Resin. Rosin Spirit—Rosin Oil. Chemistry of the Terpenes. Wood Tar, Wood Turpentine, Wood Creosote, etc. SPIRIT VARNISH. RESINS AND COLORING MATTERS. Benzoin, Dammar, Kauri, etc. Dragons' Blood. Japanese, Chinese and Burmese Lacquers. Manilla Copal. Shellac. Colors and Stains. METHODS OF MANUFACTURE. Principles of Spirit Varnish Manufacture. Amber and Asphaltum, Collodion, and Celluloid Spirit Varnishes. Copal Spirit Varnishes, Dammar Spirit Varnishes. India-Rubber Insulating, Mastic, and Matter Spirit Varnishes. Rosin Spirit Varnishes. SPIRIT VARNISHES, ANALYSIS AND TESTING. Technical Valuation. The Determination of the Resins and Solvents in Spirit Varnishes.

PARRY, E. J., and COSTE, J. H. *Chemistry of Pigments.* Ill., 6 x 8½, 288 pp. \$5.00

CONTENTS: Uses of Pigments; Methods of Application of Pigments; Inorganic Pigments; Organic Pigments.

PETIT, G. *The Manufacture and Comparative Merits of White Lead and Zinc White Paints.* Translated from the French by D. Grant. 5 x 7½, 103 pp. \$2.00

CONTENTS: Fundamental Principles of Painting in Oil; Basis, Coloring Principle, Vehicle, Thinners, Driers; The Different Varieties of White Lead; Methods of Manufacture; Other Processes (than Dutch) of Manufacturing White Lead; White Lead Substitutes; Sophistication of White Lead; Analysis of White Lead;

Merits and Defects of White Lead Paints; Toxicology of White Lead; Zinc White, Its History and Preparation; Grinding of Zinc White to a Stiff Paste in Oil; Livache's Law as to Ratio of Oil to Pigment; Packing and Packages and Storage, Gross and Net Weights; Zinc White Paint and Zinc White Coatings; Their Merits and Defects.

Recipes for the COLOR, PAINT, VARNISH, OIL, SOAP AND DRY-SALTERY TRADES. Compiled by an analytical chemist. *Second Edition, Revised and Enlarged.* 6 x 9, 330 pp. **\$5.00**

CONTENTS: Pigments or Colors for Paints, Lithographic and Letterpress Printing Inks, etc.; Mixed Paints, Paint Removers and Preparations for Paint Making, Painting, Lime Washing, Paper Hanging, etc.; Varnishes for Decorators, Coach Builders, Cabinet Makers, Woodworkers, Metal Workers, Photographers, etc.; Soaps for Toilet, Cleansing, Polishing, etc.; Perfumes; Lubricating Greases, Oils, etc.; Cements, Pastes, Glues and Other Adhesive Preparations; Writing, Marking, Endorsing, Stencil and Other Inks, Sealing Wax and Other Requisites; Preparations for the Laundry, Kitchen, Stable and General Household Uses; Disinfectant Preparations and Sheep Dips; Leather Greases, Vanishes, Dressings, Polishes, etc.; Miscellaneous Preparations.

SCHWEIZER, V. *Distillation of Resins, Resinate Lakes and Pigments.* Carbon pigments and pigments for typewriting machines, manifolders, etc. 68 ill., 6 x 8¾, 191 pp. **\$5.00**

CONTENTS: Resins and Their Employment for Production of Chemical Products; Rosin; Hard Resins; Distillation of Hard Resins; Manufacture of Illuminating Gas from Rosin; Dry Distillation of Rosin; Rosin Oils; Nature of Crude Products; Rectification of Rosin Oil; Manufacture of Patent Lubricants; Rosin Soaps or Resinates; Manufacture of Resinate Varnishes; Of Lampblack and Lampblack Pigments; Lampblack Chambers; Of Printing Inks; Other Lampblack Inks; Inks for Typewriting Machines.

SMITH, J. C. *The Manufacture of Paint.* A practical handbook for paint manufacturers, merchants and painters. *Second Revised and Enlarged Edition.* 80 ill., 5½ x 8¾, 285 pp. **\$5.00**

CONTENTS: Scope of Subject and Definition of Terms; Sorting, Handling, Testing, and Valuation of Raw Material; Paint and Machinery; The Grinding of: White Pigments, Earth Pigments, Oxide of Iron Pigments, Black Pigments, Chemical Pigments, Pigments in Water, Turpentine, Gold-Size, and Special Mediums; Mixed or Prepared Paints; Enamels and Enamel Paints; Modern Conditions Which Affect the Selection and Application of Paint; Designing, Testing and Matching Paints; Economic and General Considerations.

TOCH, MAXIMILIAN. *The Chemistry and Technology of Paints.* *Second Edition, Revised and Enlarged.* 83 photomicrographic plates and other illustrations, 6½ x 9¼, 366 pp. **\$4.50**

CONTENTS: *Introduction. The Manufacture of Mixed Paints. The White Pigments:* White Lead, Sulphate of Lead, Sublimed White Lead, Standard Zinc Lead White, Ozark White, Zinc Oxid, Zinox, Lithopone. *The Oxides of Lead:* Litharge, Red Lead, Blue Lead. *The Red Pigments:* Venetian Reds, Indian Red, Permanent Vermilion, Helio Fast Red, Lithol Red. *The Brown Pigments:* American Burnt Sienna, Italian Burnt Sienna, Burnt Umber, Burnt Ochre, Prince's Metallic or Princess Mineral Brown, Vandyke Brown. *The Yellow Pigments:* American Yellow Ochre, French Yellow Ochre, Chrome Yellow, Chromate of Zinc. *The Blue Pigments:* Ultramarine Blue, Artificial Cobalt Blue, Prussian Blue. *The Green Pigments:* Chrome Green, Chromium Oxid, Green Aniline Lakes, Zinc Green, Verte Antique (Copper Green). *The Black Pigments:* Lampblack, Carbon Black, Graphite, Charcoal, Vine Black, Coal, Ivory Black, Drop Black, Black Toner, Benzol Black, Acetylene Black, Mineral Black. *The Inert Fillers and Extenders:* Barytes, Artificial Barium Sulphate, Barium Car-

bonate, Silicia, Infusorial Earth, Kieselguhr, Fuller's Earth, Clay, Asbestine, Asbestos, Calcium Carbonate, White Mineral Primer, Marble Dust, Spanish White, Artificial Calcium Carbonate, Gypsum. *Mixed Paints*: Anti-fouling and Ship's Bottom Paints, Concrete or Portland Cement Paints, Paint Containing Portland Cement, Damp Resisting Paints, Enamel Paints, Flat Wall Paints, Floor Paints, Shingle Stain and Shingle Paint. *Linseed Oil*: Linseed Oil, Standard Specifications, American Society for Testing Materials for Linseed Oil, U. S. Navy Department Specifications for Linseed Oil, Stand Oil, Japanner's Prussian Brown Oil. *Chinese Wood Oil*: Chinese Wood Oil, A Method for the Detection of Adulteration of China Wood Oils, Standard Specifications American Society for Testing Materials for Purity of Raw Chinese Wood Oil. *Soya Bean Oil*. *Fish Oil*. *Miscellaneous Oils*: Herring Oil, Corn Oil. *Turpentine*: Turpentine, Wood Turpentine, Standard Specifications American Society for Testing Materials for Turpentine, U. S. Navy Department Specifications for Turpentine. *Pine Oil*. *Benzine*. *Turpentine Substitutes*: Benzol, Toluol, Xylol, Solvent Naphtha. *Cobalt Driers*. *Combining Mediums and Water*: Combining Mediums, Water in the Composition of Mixed Paints. *Fine Grinding*. *The Influence of Sunlight on Paints and Varnishes*. *Paint Vehicles as Protective Agents Against Corrosion*. *The Electrolytic Corrosion of Structural Steel*. *Painters' Hygiene*. *The Growth of Fungi on Paint*. *Analysis of Paint Materials*: White Lead, Basic Lead Sulphate, Zinc Lead, Zinc Oxid, Lithopone, Red Lead and Orange Mineral, Iron Oxids, Umbers and Siennas, Mercury Vermilion, Chrome Yellows and Oranges, Chrome Greens, Prussian Blue, Ultra-marine, Black Pigments, Graphite, Blanc Fixe, Whiting, Gypsum or Calcium Sulphate, Silica, Asbestine, Clay, Barytes, Barium Carbonate, Mixed White Paints, White Pigments, Paints Rosin, Rosin Oils, Oils, Appendix.

TOCH, MAXIMILIAN. *Materials for Permanent Painting.* A manual for manufacturers, art dealers, artists, and collectors. 8 plates, one colored, 5 x 7 $\frac{1}{4}$, 208 pp. **\$2.00**

CONTENTS: History of Painting. Pigments Used by the Ancients. Synopsis, the Search for the Masters' Secret. Photo-Chemical Deterioration of Oil Paintings. Cause of the Cracking of Paintings and the Remedies. Canvas, wood and Metal as Foundations. Preparation of Canvas in Commercial Practice. Renovation and Cleaning of Pictures. The School of Impressionism. Volatile Solvents. Picture Varnishes. Driers. Linseed Oil and Other Drying Oils. Classification of Pigments and their Description. The Permanent Colors. Pigments Dangerous to Health. Pigments Affected by Coal Smoke, etc. Water in Tube Colors. Pigments which are Permanent, etc. Pigments which Dry Slowly. The failure of Sir J. Reynolds' Paintings.

An effort to show in plain language what the painter shall do with reference to his colors and materials upon which he paints to produce paintings that will not deteriorate with age or exposure to light. The author shows, popular belief notwithstanding, that the science of making colors is not lost and that the ancient painters and great masters were so successful not because their materials were superior to those used and made to-day, but because they knew how to use their inferior materials properly. This is a simple exposition of the chemistry of colors for the non-chemist.

WRIGHT, A. C. *Simple Method for Testing Painters' Materials.* Ill., 5 $\frac{1}{4}$ x 7 $\frac{1}{2}$, 160 pp. **\$2.50**

CONTENTS: Apparatus; Reagents. *Practical Tests*. Dry Colors; Stiff Paints; Liquid and Enamel Paints; Oil Varnishes; Spirit Varnishes; Driers; Putty; Linseed Oil; Turpentine; Water Stains. *Chemical Examination*. Dry Colors and Paints; White, Yellow, Blue, Green, Red, Brown, and Black Pigments and Paints; Oil Varnishes; Spirit Varnishes; Linseed Oil; Turpentine.

INKS

LEHNER, S. *Ink Manufacture.* Including writing, copying, lithographic, marking, stamping and laundry inks. Translated from the German

of the *Fifth Edition* by A. Morris and H. Robson. Ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 174 pp. **\$2.50**

CONTENTS: Varieties of Ink; Writing Inks; Raw Materials of Tannin Inks; Chemical Constitution of the Tannin Inks; Recipes for Tannin Inks; Logwood Tannin Inks; Ferric Inks; Alizarine; Extract, Logwood, Copying Inks; Hektographs; Hektograph and Safety Inks; Ink Extracts and Powders; Preserving Inks; Changes in Ink and the Restoration of Faded Writing; Colored Inks—Red, Blue, Violet, Yellow, Green, Metallic and Indian; Lithographic Inks and Pencils; Ink Pencils; Marking Inks; Ink Specialties; Sympathetic Inks; Stamping Inks; Laundry or Washing Blue.

SEYMOUR, ALFRED. *Modern Printing Inks.* A practical handbook for printing ink manufacturers and printers. Ill., 8vo, 90 pp. **\$3.00**

CONTENTS: Linseed Oil; Varnish; Dry Colors; Black, Whites, Yellows, Reds, Browns, Blues, Greens, Lakes; The Grinding of Printing Inks; Inks and Color Mixing; The Characteristics of Some Printing Processes; Driers; Bronze Powders and Bronzing; Things Worth Knowing.

UNDERWOOD, NORMAN, and SULLIVAN, THOMAS V. *The Chemistry and Technology of Printing Inks.* 9 ill., 6×9 , 145 pp. **\$3.00**

(Authors are chief and assistant chief, respectively, of the ink making division of the Bureau of Engraving and Printing, United States Treasury Department.)

CONTENTS: Introduction. *Testing of Materials.* Laboratory Apparatus; Methods of Analysis; Physical Tests of Pigments. *Manufacture and Properties of Ink-Making Materials.* Reds; Blues; Yellows; Greens; Oranges; Russets; Citrines; Blacks; Dilutents; Bases; Organic Lakes; Oils; Typographic Varnishes, Reducers; Driers. *The Manufacture of Printing Inks.* General Considerations; Explanation of Terms; Printing Inks; Plate Inks; Typographic Inks; Defects of Inks and Their Remedies.

A brief and practical, yet scientifically correct exposition of the many facts concerning the raw materials and finished products used in the industry. Only the most recent methods of manufacture are presented, and descriptions of the materials that have been found useful in the art are clearly and concisely described.

SOAPS.

HURST, G. H. *Soaps.* A practical manual of the manufacture of domestic, toilet and other soaps. 66 ill., $6 \times 8\frac{3}{4}$, 385 pp. **\$6.00**

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HURST, GEORGE H., and SIMMONS, W. H. *Textile Soaps and Oils.* A handbook on the preparation, properties, and analyses of the soaps and oils used in textile manufacturing, dyeing and printing. *Second Edition, Revised and Partly Rewritten.* 11 ill., $5\frac{1}{2} \times 8\frac{3}{4}$, 204 pp. **\$3.50**

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The work that soap has to do, and the objects for which it is employed in

the textile industries vary greatly, and this work describes not only the preparation of the various soaps but also the special features of the most suitable soaps for each of these purposes.

LAMBORN, L. L. *Modern Soaps, Candles, and Glycerin.* A practical manual of modern methods of utilization of fats and oils in the manufacture of soaps and candles, and the recovery of glycerin. 228 ill. $6\frac{1}{2} \times 9\frac{1}{4}$, cloth, 708 pp. **\$7.50**

CONTENTS: The Soap Industry; Raw Materials of Soap Making;; Bleaching and Purification of Soap Stock; Chemical Characteristics; Mechanical Equipment of a Factory; Cold-Process and Semi-Boiled Soap; Grained Soap; Settled Rosined Soap; Milled Soap Base; Floating Soap; Shaving Soaps; Medicated Soap; Essential Oils and Soap Perfumery; Milled Soap; Candles; Glycerin; Examination of Raw Materials and Factory Products.

SIMMONS, W. H., and APPLETON, H. A. *Handbook of Soap Manufacture.* 27 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 167 pp. **4.00**

CONTENTS: Definition of Soap; Properties; Hydrolysis; Detergent Action; Constitution of Oils and Fats, and Their Saponification; Raw Materials Used in Soap-Making; Bleaching and Treatment of Raw Materials Intended for Soap-Making; Soap-Making; Treatment of Settled Soap; Toilet, Textile, and Miscellaneous Soaps; Soap Perfumes; Glycerine Manufacture and Purification; Analysis of Raw Materials, Soap, and Glycerine; Statistics of the Soap Industry; Comparison of Degrees, Twaddell and Baume, with Actual Densities; Comparison of Different Thermometric Scales; Table of the Specific Gravities of Solutions of Caustic Soda; Table of Strength of Caustic Potash Solution to 60° F.

WATT, A. *Art of Soapmaking.* A practical handbook of the manufacture of hard and soft soaps, toilet soaps, etc. *Seventh Edition, Revised and Enlarged.* 43 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 323 pp. **\$4.00**

CONTENTS: The Soap Factory; Materials Used in Soap Making; Caustic Lyes; Manufacture of Hard Soaps; Cold Process of Manufacture; Oleic Acid; Cheapened Soaps; Disinfecting Soaps; Saponification Under Pressure; Various Processes; Manufacture of Soft Soaps; Of Toilet Soaps; Medicated Soaps; Miscellaneous Soaps and Processes; Alkalimetry; Soap Analysis; Purifying and Bleaching Oils and Fats; Recovery of the Glycerine from Waste or Spent Lyes; Useful Notes and Tables; Modern Candle Making.

COSMETICS, PERFUMES

KOLLER, T. *Cosmetics.* A handbook of the manufacture, employment and testing of all cosmetic materials and cosmetic specialties. Translated from the German by Charles Salter. $5\frac{1}{4} \times 7\frac{1}{2}$, 269 pp. **\$2.50**

CONTENTS: Purposes, Uses and Ingredients of Cosmetics; Preparation of Perfumes; Chemical and Animal Products Used in the Manufacture of Cosmetics; Oils and Fats Used; General Preparations; Mouth-Washes and Tooth Pastes; Preparations for the Hair; Antiseptic Washes and Soaps; Preparations for the Skin, etc.; Testing the Materials Used in Making Cosmetics.

PARRY, ERNEST J. *The Chemistry of Essential Oils and Artificial Perfumes.* In two volumes. Ill., $6\frac{1}{2} \times 10$.

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iate Verbanaceae; Convolvulaceae; Primulaceae; Rubiaceae; Oleaceae; Ericaceae; Valerianaceae; Compositae; Umbelliferae; Myrtaceae; Rosaceae; Calcanthaceae; Rutaceae; Zgophyllaceae; Anacardiaceae; Burseraceae; Leguminosae; Geraniaceae; Tropaeolaceae; Meliaceae; Cruciferae; Magnoliaceae; Anonaceae; Pittosporaceae; Hamamelidaceae; Cistaceae; Resedaceae; Turneraceae; Canellaceae; Dipterocarpaceae; Theaceae; Malvaceae; Ranunculaceae.

Vol. II. Constituents of Essential Oils, Synthetic Perfumes and Isolated Aromatics, and the Analysis of Essential Oils. *Third Edition, Revised and Enlarged.* Ill., 351 pp. **\$7.00**

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FERNBACH, R. L. Glue and Gelatine. A practical treatise on the methods of testing and use. 5½ x 8, 218 pp. **\$3.00**

CONTENTS: Classification and Testing of Glues; Analysis of Glues and Gelatines; Substitutes; Foreign Glues; Selection of Glues for Various Industries; How Glue Should be Used; Commercial and Legal Aspects; Manufacturing Receipts; Analytical Methods.

This work differs from previous works on the subject, in that it is written from the standpoint of the glue consumer and not of the glue manufacturer; manufacturing methods are dealt with only insofar as they affect glue testing; the test methods given are those employed by the manufacturers in grading glues and assigning their price; it presents an exhaustive comparison of the merits of domestic and foreign glues, and it deals extensively with the commercial and legal aspects of the subject.

RIDEAL, S. Glue and Glue Testing. *Second Edition, Revised and Enlarged.* 14 ill., 5¾ x 8¾, 194 pp. **\$5.00**

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CLAPPERTON, G. Practical Paper-making. A manual for paper-makers and owners and managers of paper mills, to which are appended useful tables, calculations, data, etc., with illustrations reproduced from microphotographs. *Second Edition, Revised and Enlarged.* Ill., 5 x 8, 236 pp. *Reprinting*

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CONTENTS: Cellulose. The Cellulose Nitrates (Theory). Nitration of Cellulose (Practice). Cellulose Nitrate Solvents and Non-solvents. Fusel Oil, Natural and Synthetic. Amyl Alcohols. Manufacture and Properties of Amyl Acetate. Natural, Artificial, Synthetic Camphor. Camphor Substitutes. Paint Removers. Turpentine Substitutes. Pyroxylin Solutions. Pyroxylin Lacquers. Bronzing Liquids. Water-proofing Compositions. Artificial Leather, Fur, Skin, Feathers, Rubber. Pyroxylin-coated Leather and Splits. Patent and Enameled Leather. Celluloid, Pyralin, Xylonite, Viscoloid. Pyroxylin Plastics. Celloidin and Cellulose Nitrates in Microscopy. Collodion and Celluloid Nitrates in Pharmacy, Medicine. Film Manufacture and Photography. Artificial Silk, Whalebone, Gorse, Horsehair. The Cellulose Acetates. Gun Cotton and the Explosive Cellulose Nitrates. Viscose, Viscoid, and the Cellulose Xanthates. Denatured Ethyl Alcohol. Patent, Author, and Subject Index.

The most complete and comprehensive work on the general technology of nitro-cellulose ever issued in any language, and adequately covers the entire field in detail. It contains over 8000 patent and literature references of over 2900 different investigators, representing the work of everyone in the field from the earliest days to the present.

WORDEN, E. C. *Technology of Cellulose Esters.* A theoretical and practical treatise on the origin, history, chemistry, manufacture, technical application and analysis of the products of acylation and alkylation of normal and modified cellulose, including nitrocellulose, celluloid, pyroxylin, collodion, celloidin, gun-cotton, acetylcellulose and viscose, as applied to technology, pharmacy, microscopy, medicine, photography and the warlike and peaceful arts. In ten volumes. 600 ill., 12 plates, containing upwards of 110,000 patent and literature references to the work of 12,000 different investigators. *An Exhaustive Treatise.* 4000 pp.

Carbohydrate Carboxylates (Cellulose Acetate), being Vol. VIII. Ill., 6½ x 9½, 611 pp. \$5.00

CONTENTS: *Raw Materials.* Starch; Cellulose; Cotton; Methylation and Ethylation of Cellulose; Acetolysis and Octa-Acetylcellobiose; Formic Acid; Acetic Acid; Acetic Anhydride. *Manufacture of Cellulose Esters.* Historical; Investigations of Stein; Chemistry; Cellulose Mono-acetate, Diacetates, Triacetates, Tetracetate, Pentacetate; Theory of Acetylation; Methods of Manufacture; Superficial Acetylation of Cellulose; Acetylation of Modified Cellulose; Commercial Manufacture of Partially Hydrated, Acetone-Soluble Cellulose Acetate; Other Partial Hydration Processes; Acetation with Sulfuric Acid Containing Catalysts; Manufacture of Cellulose Acetate with Zinc Chloride; Acetation: with Substituted Acetic Acids, in Presence of Chlorides, without Apparent Change in Structural Form; Purification; Bleaching Acetated Cellulose; Recovery of Acetic Anhydride and Acid; Acetates of the Carbohydrates; Cellulose Formate; Cellulose Propionates; Cellulose Butyrates; Starch Formate; Starch Acetate; Cellulose Aceto-Nitrates; Cellulose Aceto-Sulfates; Cellulose Benzoates. *Cellulose Acetate Solvents, Non-solvents and Plastic-Inducing Bodies.* Alcohols; Ethers; Aldehydes; Ketones; Acids; Esters; Nitro and Amido Solvents; Essential Oils; Other Cellulose Ester Plastic-inducing Bodies; Diacetone Alcohol; Solvent Recovery; Wood Oil; Hydrocarbon Chlorides; Chloroform; Carbon Tetrachloride; Dichlorethylene; Trichlorethylene; Perchlorethylene; Chlorhydrins; Tetrachlorethane; Pentachlorethane; Hexachlorethane; Benzine and Benzene. *Commercial Application of the Uninflammable Cellulose Esters.* Cellulose Acetate Plastics; Cellit; Cellon, Sicoid; Sericose; Boroid and Cellolite; Acetate Lacquers; Acetate Bronzing Liquids; Imitation Gold Leaf; Gilded Lace; Treating Linen with Cellulose

Acetate; Cellulose Acetate Imitation Leather; Cellulose Acetate Compound Fabrics; Coating of Skins with Cellulose Acetate; Artificial Bristles; Preservation of Documents with Acetate Lacquers; Artificial Filaments from Cellulose Acetate; Bayko Yarn; Artificial Horsehair; Microscopy of Acetate Silk; Strengthening Artificial Filaments; Artificial Sponge; Dyeing Cellulose Acetate; Carbon Filaments from Cellulose Acetate; Acetylated Cellulose in the Explosives Industry; Cellulose Acetate as Insulating Material; Cellulose Acetate for Toughening Incandescent Mantles; Acetic Collodion; Cellulose Acetate Photographic Emulsions; Acetylcellulose Sheets; Continuous Photographic Films; Waterproofing Acetate Films; Automobile Wind Shields; Testing Acetate Films; Utilization of Waste Acetate Films; Chronophotography, Motography; Cellulose Acetate Window Panes; Cellulose Acetate Phonograph Records; Capping Bottles with Cellulose Acetate; Cellulose Acetate in Air-craft Manufacture; Coating Cigar Tips; Cellulose Acetate in Pharmacy; Solidified Alcohol; Feculose. *Analysis of Uninflam-
mable Cellulose Esters.* Estimation of Formic Acid; Acetic Acid; Congealing Points of Acetic Acid; Acetic Anhydride; Acidity of Mixtures of Acetic Acid and Anhydride; Calculation of Acetic Anhydride by Titration; Index of Refraction; Density of Acetic Acid; Refractometric Determination of Acetic Anhydride; Method of Menschutkin and Wasiljeff; Analysis of the Cellulose Acetates, Moisture, Ash, Solubility; Viscosity; Tensile Strength; Stability Tests; Determination of the Copper Number; Determination of Acid Radicals; Method of Green and Perkin; Method of Ost; Sodium Ethylate Method; Method of Barthelemy; Modification of Eberstadt; Determination of Combined Sulfuric Acid; Work of Stein; Patent, Name and Subject Indices.

MISCELLANEOUS INDUSTRIES

DUMESNY, P., and NOYER, J. Wood Products, Distillates and Extracts.

The Chemical Products of Wood Distillation, Dyeing and Tanning Extracts from Wood. 107 ill., 59 tables, 6½ x 10, 336 pp. **\$5.00**

CONTENTS: *The Distillation of Wood*; Generalities; Principal Methods of Carbonising or "Coaling" Wood; The Acetic Acid Industry; Secondary Products of Wood Distillation; Analysis of Raw Materials and Finished Products; Destructive Distillation of Olive Oil Residuals; Methyl Alcohol; Table of Density; *The Manufacture and Testing of Tan Wood Extracts and Their Utilization in Modern Tanneries*; Chestnut Wood Extract; Plant and Equipment for Treating Chestnut Wood; Specification of Model Type of an Extract Factory; Capital Required, etc.; Number and Capacity of Extract Factories; Method of Using Chestnut Wood Extracts in Tanning; Manufacture and Use of Oak Wood Extracts; Manufacture and Use of Quebracho and Sumac Extract; Khaki Substitute for Quebracho and its Use in Tanning; Extract from Various Tanning Substances; Their Manufacture and Uses; Divi-Divi; Valonia; Chinese Galls; Myrobolam; Palmetto; Mimosa; Tara; Mangrove, etc.; Manufacture and Use of Logwood Extract; Analysis of Tanning Substances; The Official Method of the International Association of Leather Chemistry; Appendix.

HUBBARD, E. The Utilization of Wood Waste. Second Edition. Translated from the German of the Second Revised and Enlarged Edition by M. J. Salter. 50 ill., 5¼ x 7½, 208 pp. **\$2.50**

CONTENTS: Utilization of Sawdust; Employment of Sawdust as Fuel; With and Without Simultaneous Recovery of Charcoal and the products of Distillation; Manufacture of Oxalic Acid from Sawdust; Manufacture of Spirit (Ethyl Alcohol) from Wood-waste; Patent Dyes (Organic Sulphides, Sulphur-dyes or Mercapto-dyes); Artificial Wood and Plastic Compositions from Sawdust-Production of Artificial Wood-Compositions for Moulded Decorations; Employment of Sawdust for Blasting Powders and Gunpowders; Employment of Sawdust for Briquettes; Employment of Sawdust in the Ceramic Industry and as an Addition to Mortar; Manufacture of Paper Pulp from Wood; Various Applications of Sawdust and Wood-Refuse; The Production of Wood Wool.

A complete account of the most advantageous methods of working up wood-refuse, especially sawdust, exhausted dye-woods and tan, as fuel, as a source of chemical products, for artificial wood-compositions, explosives, manures, and many other technical purposes.

KOLLER, T. *The Utilization of Waste Products.* A treatise on the rational utilization, recovery and treatment of waste products of all kinds. *Third Edition, Revised and Enlarged*, by H. B. Stocks. 22 ill., 6 x 9, 346 pp. **\$5.00**

CONTENTS: The Waste of Towns; Blood and Slaughter-House Refuse; Fat from Waste; Tannery Waste; Leather Waste; Fur and Feather Waste; Waste Horn; Fish Waste; Mother-of-Pearl Waste; Vegetable Ivory Waste; Waste Wood; Cork Waste; Waste Paper and Bookbinders' Waste; By-Products of Paper and Paper Pulp Works; Waste Produced in the Manufacture of Parchment Paper; Wool Waste; Silk Waste; Waste Waters of Cloth Factories; Cotton Spinners' Waste; Jute Waste; Utilization of Rags; Coloring Matters from Waste; Residues in the Manufacture of Aniline Dye; Dyers' Waste Waters; Waste Produced in Butter Making; Molasses; Waste Liquids from Sugar Works; Fruit; Waste Products of the Manufacture of Starch; Brewers' Waste; Wine Residues; India Rubber and Caoutchouc Waste; Amber Waste; Utilization of Turf or Peat; Manufactured Fuels; Illuminating Gas from Wastes and the By-Products of the Manufacture of Coal-Gas; By-Products in the Treatment of Coal-Tar Oils; Ammonia Recovery; Petroleum Residues; By-Products in the Manufacture of Rosin Oil; Soap-Makers' Waste; Alkali Waste and the Recovery of Soda; Recovery of Potash Salts; Sulphur; Salt Waste; Gold and Silver Waste; Platinum Residues; Iridium from Goldsmiths' Sweepings; Metal Waste; Tinplate Waste; Calamine Slimes; Waste Iron; By-Products of the Manufacture of Mineral Waters; Infusorial Earth; Meerschauum; Mica Waste; Slate Waste; Broken Porcelain; Earthenware and Glass; Utilization of Waste Glass.

LAMBORN, L. L. *Cottonseed Products.* A manual of the treatment of cottonseed for its products and their utilization in the arts. 79 ill., 1 folding plate, 6½ x 9½, 253 pp. **\$4.00**

CONTENTS: The Cotton Plant; The Cottonseed Industry; Cottonseed; Products; Manufacture of Oleomargarine and Lard Compound; Manufacture of Soap and Soap Powder; Cottonseed-Meal and Hulls for Cattle-Food and Fertilizer; Government Regulations of Transactions in Cottonseed Products.

MITCHELL, C. A. *Mineral and Aerated Waters.* 111 ill., 6 x 9, 244 pp. **\$3.00**

CONTENTS: Origin and Properties of Natural Mineral Waters. Gases in Natural Waters. Holy Wells. The Zem-Zem Well at Mecca. Spas and Their Springs. Natural Mineral Table Waters. Thermal Springs and Radio-Activity, Temperatures. Helium and Niton in Mineral Waters. Measurement of Radio-Activity. Artificial Radio-Active Mineral Waters. Carbon Dioxide, Its Preparation Properties and Uses in the Mineral Water Factory. Artificial Mineral Waters. Early Forms of Carbonating Waters. The Machinery of To-day. Arrangement of a Soda Water Factory. Bottles and Bottling Machinery. Making of Ginger Beer. Examination of Mineral Waters. Bibliography.

An outline of the early methods of making artificial mineral waters leading up to a description of the apparatus of the modern carbonating plant. Gives much information concerning many of the European Spas and their springs, together with analyses of their waters.

TEXTILES

Art of DYEING WOOL, SILK AND COTTON. Translated from the French of M. Hellot, M. Macquer and M. Le Pileur D'Apligny. First published in English in 1789. 11l., 6 x 8¾, 466 pp. **\$2.00**

This volume describes methods used by the pioneer French and English dyers in dyeing wool and woolen cloths, stuffs yarn, worsted, silk, cotton and linen thread, giving formulas for mixing colors and applying them, together with methods for stamping silks and cottons.

BARKER, ALFRED F. Textiles. With additional chapters by W. M. Gardner, R. Snow, W. H. Cook and F. Radbury. 86 ill., 5¾ x 8½, 387 pp. (Van Nostrand's Westminster Series.) **\$2.50**

CONTENTS: History of the Textile Industries. Textile Inventions and Inventors. Wool, Silk, Cotton, Flax, etc., Growing Industries. The Mercerized and Artificial Fibres Employed in the Textile Industries. Dyeing of Textile Materials. Principles of Spinning. Processes Preparatory to Spinning. Principles of Weaving. Principles of Designing and Coloring. Principles of Finishing. Textile Calculations. The Woolen, Worsted, Dress Goods, Stuff and Linings, and Tapestry and Carpet Industries. Silk Throwing and Spinning. The Cotton Industry. The Linen Industry Historically and Commercially Considered. Recent Developments and the Future of the Textile Industries.

BARKER, ALDRED F., and MIDGELY, EBER. **Analysis of Woven Fabrics.** 82 illustrations, 26 tables. 5¾ x 8¾, 319 pp. **\$3.50**

CONTENTS: Qualities of Raw Materials and of Yarns; Calculations Relating to Yarns and to the Weight of Cloths; Setts and Setting of Cloths; Weave Analysis; Drafts and Pegging Plans; Effects of Dyeing and Finishing on Wool Cloths, on Union Dress Fabrics, Lining and Cotton Cloths; Obtaining the Loom Particulars from a Small Sample of Finished Cloth; Examples in the Analysis of Woven Fabrics; Quick Methods of Analysis, Standard Weights and Gauges; Qualitative and Quantitative Analysis of Fibres in Woven Fabrics; Costing of Woven Fabrics; Glossary of Terms Applied to Woven Fabrics; Appendix.

A practical book explaining the procedure, as well as the theory, of analyzing finished fabrics to determine their loom particulars. It explains how to control the various qualities of the finished product by pre-determining the varieties and qualities of the materials to be employed in its production. A special and important chapter giving cost data should be helpful in the determination of the price of the cloth. It answers the superintendent's and the designer's everyday questions in a practical way.

BEAUMONT, ROBERTS. **The Finishing of Textile Fabrics.** (Woolen, Worsted, Union and other Cloths.) 151 ill., 5½ x 8¾, 279 pp. **\$5.00**

CONTENTS: Woollen, Worsted and Union Fabrics. Processes of Finishing and their Efferts. The Process of Scouring. Scouring Machines. Theory of Felting. Fabric Structure, Compound Fabrics. Fulling and Milling Machinery. The Theory of Raising. Raising Machinery and Raising Process. Cutting, Cropping or Shearing. Lustring Process and Machinery. Methods of Finishing.

BEAUMONT, R. **Color in Woven Design.** A treatise on the science and technology of textile coloring (woolen, worsted, cotton and silk materials). *New Edition, Rewritten and Enlarged.* 39 colored plates. 367 ill., 6½ x 9, 396 pp. **\$6.00**

(Author is professor of textile industries, The University of Leeds.)

CONTENTS: Theories of Color. Attributes of Colors. Contrast and Harmony. Color Standardization. Mixtures. Elements of Textile Coloring-stripes. Check Patterns. Simple Colorings. Compound Colorings. Fancy Shades Applied to

Special Designs. Coloring of Combination Designs. Spotted Effects. Coloring of Double Weaves and Reversibles. Figured Textiles. Colored in the Warp. Weft-colored Figured Fabrics—Curl Textures.

BEAUMONT, R. *Standard Cloths, Structure and Manufacture.* (General Military and Naval.) 150 ill., 16 plates, $5\frac{1}{2} \times 8\frac{3}{4}$, 342 pp. **\$6.00**

CONTENTS: Microscopic Features; Fabric Quality; Synopsis of Cloths; Standard Grades of Manufacture; Weaves Types; Fabrics Light in Weight and Structure; Medium-Weight Woollens; Medium-Weight Worsteds; Overcoating Group of Fabrics; Army and Navy Cloths; Fibrous-Faced Fabrics; Felt Manufactures; Appendix.

BEECH, FRANKLIN. *The Dyeing of Cotton Fabrics.* A practical handbook for the dyer and student. *Second Revised Edition.* 44 ill., $5\frac{1}{2} \times 8\frac{1}{2}$, 275 pp. **\$5.00**

CONTENTS: Structure of the Cotton Fibre; Bleaching of Cotton Fabrics Prior to Dyeing; Dyeing Machinery and Dyeing Manipulations; The Principles and Practice of Cotton Dyeing; Dyeing Union (Mixed Cotton and Wool) Fabrics; Dyeing Half Silk (Cotton-Silk, Satin) Fabrics; Operations Following Dyeing; Testing the Color of Dyed Fabrics; Experimental Dyeing and Comparative Dye Testing.

BEECH, F. *Dyeing of Woolen Fabrics.* With diagrams and figures. 33 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 243 pp. **\$3.50**

CONTENTS: Wool Fibre; Processes Preparatory to Dyeing; Dyeing Machinery and Manipulations; Principles and Practice of Wool, Mixed Cotton and Wool, Gloria Dyeing; Operations Following Dyeing; Experimental Dyeing and Comparative Dye Testing; Testing the Color of Dyed Fabrics.

BOOTH, N. *The Ring-Spinning Frame.* Ill., $5 \times 7\frac{1}{2}$, 82 pp. **\$2.00**

CONTENTS: The Ring-Spinning Frame; Ring Traveller; Traveller Clearer; Ballooning "Finger Space" Separator; Spindles; Lubrication; Pokers; Weighting of Rollers; Particulars or Formulæ of a Ring Frame; Calculations; Tables; Specifications.

BOTTLER, M. *Modern Bleaching Agents and Detergents.* Translated by C. Salter. 16 ill., $6\frac{1}{4} \times 9\frac{1}{4}$, 160 pp. **\$2.50**

CONTENTS: Old and New Methods and Agents; Sodium Peroxide Perborates; Ozone; Sodium Bisulphite and Hydrosulphurous Acid; Discharging Color from Textile Fabrics with Hydrosulphurous Acid; Permanganate; Hydrogen Peroxide; New Process for Bleaching Fats, Oils, Wax, Paraffin, Soap and Glue; Solid, Stable Calcium Hypochlorite and Bleaching Soda; Electric Bleaching; Benzine Soaps; Extractive Detergents and Detergent Mixtures; Properties of Carbon Tetrachloride; Aceto-Oxalic Acid as a Detergent; Special Methods of Removing Stains; Bleaching Processes Used in Chemical Cleaning; Hydrogen Peroxide; Oxygenol and Sodium Peroxides as Detergents; Sundry New Detergents and Cleansing Agents.

CARTER, HERBERT A. *Ramie (Rhea), China Grass.* The new textile fibre and all about it. A book for planters, manufacturers, and merchants. Ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 140 pp. **\$3.00**

CONTENTS: The Ramie Plant. Its Varieties. Soil and Climate Essential for Culture. Ramie Cultivation. Method of Planting and Gathering the Crop. Yields Obtainable. The "Bon" or "Ban" Rhia or Rhea. The Decortication of Rhea or Ramie Fibre. Methods of Preparing Ramie Ribbons for the Market. De-gumming Ramie of Rhea. Preparing and Combing. Drawing, Roving, and Spinning Ramie and China Grass, Twisting, etc. Weaving, Dyeing, Printing and Finishing of Rhea. China Grass or Ramie Fibre. Ramie, Rhea and China Grass in Great Britain, on the European Continent, in the United States

of America, and in South Africa. Uses to which Ramie, Rhea, and China Grass Yarns can be put in Trade. How to Manufacture it Profitably. Ramie Cultivation in China and the Chinese Grass Cloth Industry.

CARTER, H. R. **Modern Flax, Hemp, and Jute Spinning.** A practical handbook for the use of flax, hemp, and jute spinners, thread, twine and rope makers. 92 ill., 6 x 8 $\frac{3}{4}$. **\$3.50**

CONTENTS: Raw Fibre; Hackling; Silver Formation; Line and Tow preparing; Gill Spinning; The Flax, Hemp, and Jute Roving Frame; Dry and Half-dry Spinning; Wet Spinning of Flax, Hemp, and Tow; Yarn Department; Manufacturer of Threads, Twines, and Cords; Rope Making; Mechanical Department; Mill Construction; Index.

CARTER, H. R. **Bleaching, Dyeing and Finishing of Flax, Hemp and Jute Yarns and Fabrics.** 20 ill., 5 $\frac{1}{2}$ x 8 $\frac{3}{4}$, 172 pp. **\$1.25**

CONTENTS: Chemistry of Bleaching; Materials; Art of Dyeing; Dyes and Dyestuffs; Printing; Finishing; Bleach and Dye Works.

CLAPHAM, J. H. **The Woolen and Worsted Industries.** Ill., 5 $\frac{1}{2}$ x 7 $\frac{3}{4}$, 319 pp. **\$2.00**

CONTENTS: Introductory; Manufacturing Processes; Raw Materials and the Trade in Them; Industrial and Commercial Organization; Labor in the Industries; The Industries in Abroad; Imports and Exports.

ERMEN, W. F. A. **The Materials Used in Sizing.** Their chemical and physical properties, and simple methods for their technical analysis and valuation. Ill., 5 $\frac{1}{4}$ x 7 $\frac{1}{2}$, 130 pp. **\$2.00**

CONTENTS: The Starches and Other Agglutinants; Weighting Materials; Softening Ingredients; Antiseptics; Analysis of Sized Warps and Cloth; The Preparation of Normal Volumetric Solutions; Tables.

GRUNER, A. **Power-loom Weaving and Yarn Numbering,** according to various systems, with conversion tables. An auxiliary and text-book for pupils of weaving schools, as well as for self-instruction, and for general use by those engaged in the weaving industry. Ill., colored diagrams, 5 x 7 $\frac{1}{2}$, 162 pp. **\$3.50**

CONTENTS: Power Loom in General; Mounting and Starting; English Looms; Dobbies; Jacquards; Mounting; Important Starting Details; Negative Regulator; Crompton System; Calculations; Working Change Cards; Numbering, Reeling and Packing of Yarn; Shortage; Table of Lengths; Carded Yarn; Useful Hints.

HEERMANN, P. **Dyers' Materials.** An introduction to the examination, valuation, and application of the most important substances used in dyeing, printing, bleaching and finishing. Translated by Arthur C. Wright. *Second Edition, Revised and Enlarged*, by H. B. Stocks. Ill., 5 $\frac{1}{4}$ x 7 $\frac{3}{4}$, cloth, 158 pp. **\$3.00**

CONTENTS: Indicators; Standard Solutions and Reagents; Water; Textile Fibres; Hydrochloric Acid and the Chlorides; Fluorides and Bifluorides; Sulphuric Acid and Sulphates; Nitric Acids and Nitrates; Chlorine; Oxygen Compounds; Sulphites; Alkalies; Peroxides; Zinc Dust; Fatty Acids and Their Salts; Cyanogen Compounds; Derivatives of Fats; Aniline and Aniline Salts; Thickening Material Dyes.

HERZFELD, J. **The Technical Testing of Yarns and Textile Fabrics.** With reference to official specifications. Translated by Charles Salter. *New Edition, In Press*

CONTENTS: Microscopical Examination of Fibres; Chemical Examination; Yarn Number Determination; Testing the Length of Yarns; External Appearance of Yarn; Twist of Yarn and Twist; Tensile Strength and Elasticity; Per-

centage of Fat; Moisture; Mode of Weaving; Warp and Weft Threads; Shrinkage; Constituents of Warp and Weft; Dressing; Waterproof Properties of Cloth; Hygroscopicity; Fastness of Dye Test; Length Determinations; Mordants and Dyes; Arsenico.

HÜBNER, JULIUS. *Bleaching and Dyeing of Vegetable Fibrous Materials.* 95 ill. (many in two colors), $6\frac{1}{4} \times 9$, 457 pp. (Outlines of Industrial Chemistry.) *Reprinting*

CONTENTS: The Vegetable Fibres. Water. Chemicals and Mordants. Bleaching. Mercerising. Mineral Colours. The Natural Colouring Matters. Basic Cotton Dyestuffs. Substantive Cotton Dyestuffs. Sulphur Dyestuffs. Acid and Resorcline Dyestuffs. Insoluble Azo-Colours, Produced on the Fibre. The Vat Dyestuffs. Mordant Dyestuffs. Colours Produced on the Fibre by Oxidation. Dyeing Machinery. Estimation of the Value of Dyestuffs. Appendix.

HURST, GEORGE H., and SIMMONS, W. H. *Textile Soaps and Oils.* A handbook on the preparation, properties, and analyses of the soaps and oils used in textile manufacturing, dyeing and printing. *Second Edition, Revised and Partly Rewritten.* 11 ill., $5\frac{1}{2} \times 8\frac{3}{4}$, 204 pp. **\$3.50**
(For contents see page 35.)

KINZER, H., and WALTER, K. *Theory and Practice of Damask Weaving.* Translated from the German by Arthur Morris and Herbert Robson. 6 ill., 18 folding plates, $6\frac{1}{4} \times 9\frac{3}{4}$, 110 pp. **\$4.00**

KRETSCHMAR, KARL. *Yarn and Warp Sizing in All Its Branches.* Translated from the German by C. Salter. 122 ill., $6\frac{1}{4} \times 10$, 192 pp. **\$5.00**

CONTENTS: The Materials to be Sized; Cotton; Linen or Flax, Ramie and Jute; Wool. The Materials Used in Sizing; The Sized Material; The Sizing Process; Apparatus for and Method of Preparing the Size; Hand-Sizing Yarn in Hanks or Warps; Machine-Sizing, Take-off Beam and Warp Tension during the Drying Process. Sizing Recipes for Different Effects; Combined Dyeing and Sizing; The Purchase and Testing of Sizing Ingredients. Flours; Starches; Dextrin; Glue; Gum Arabic; Gum Tragacanth; Soaps; Oils and Fats; Sizing Preparations.

LOMAX, J. W. *Fine Cotton Spinning.* A practical manual. Ill., $5 \times 7\frac{3}{4}$, 131 pp. **\$1.50**

CONTENTS: Terms on Which Cotton is Bought; Testing Raw Cottons; Egyptian Cottons; Opening and Scutching Machinery; Carding Engines; Combing; Drawing; Production of Good Roving; The Flyer Throstle, Ring Frame and Mule; Modern Mill Planning; Specifications for Machines; Systematic Cleaning and Overhauling of Machinery.

LORD, R. T. *Decorative and Fancy Textile Fabrics.* A valuable book with designs and illustrations for manufacturers and designers of carpets, damask, dress and all textile fabrics. 132 ill., $5\frac{1}{2} \times 8\frac{3}{4}$, cloth. 210 pp. **\$3.50**

CONTENTS: Hints on Design; Hints for Ruled Paper Draughtsmen; The Jacquard Machine; Brussels and Wilton Carpets; Tapestry Carpets; Ingrain Carpets; Axminster Carpets; Damask and Tapestry Fabrics; Scarf Silks and Ribbons; Silk Handkerchiefs; Dress Fabrics; Mantle Cloths; Figured Plush; Bed Quilts; Calico Printing.

MACKIE, J. *How to Make a Woollen Mill Pay.* $5\frac{1}{4} \times 7\frac{3}{4}$, 77 pp. **\$2.00**

CONTENTS: Blends, Piles, or Mixtures of Clean Scoured Wools; Dyed Wool Book; The Order Book; Pattern Duplicate Book; Management and Oversight; Constant Inspection of Mill Departments; Importance of Delivering Goods to Time, Shade, Strength, etc.; Plums.

MIERZINSKI, S. *The Waterproofing of Fabrics.* Translated from the German by Arthur Morris and Herbert Robson. *Second Edition, Revised and Enlarged.* 29 ill., 5 x 7½, 140 pp. **\$2.50**

CONTENTS: Definition; Preliminary Treatment of the Fabric; Waterproofing with Acetate of Alumina; Impregnation of the Fabric; Drying; Waterproofing with Paraffin Wax, Ammonium Cuprate and Insoluble Soaps of Metallic Oxides; Dyeing Waterproof Fabrics; Waterproofing with Gelatine, Tannin, Caseinate of Lime and Other Bodies; Manufacture of Tarpaulin; British Waterproofing Patents.

MITCHELL, C. A., and PRIDEAUX, R. M. *Fibres Used in Textile and Allied Industries.* 66 ill., 5¾ x 8¾, 208 pp. **\$3.50**

CONTENTS: Introduction. Wool. Vicuna. Camel Hair. Alpaca. Llama Hair. Mohair. Cashmere. Goats' Hair. Cow Hair. Horse Hair. Deer Hair. Reindeer Hair. Rabbits' Hair. Cats' Hair. Dogs' Hair. Kangaroo's Hair. Human Hair. Silk. Cotton. Mercerized Cotton. Artificial Silks. Linen. Flax Wax. Ramie. Jute. Hemp. Sisal Hemp. Pita Fibre. Manila Hemp. Musa Paradisiaca Fibre. Banana Fibre. Andersonia Fibre. Sansevieria Fibre. Sunn Hemp. Gambo Hemp. New Zealand Flax. Mauritius Hemp. Yucca Fibre. Pine Apple Fibre. Brush Fibres. Vegetable Down and Upholstery Fibres.

Brings together in a form convenient for use in the laboratory both the microscopical and chemical technical methods of examining fibres. It includes fibres used in a more or less dissociated condition in spinning, weaving, cordage, brush-making and upholstery, but does not include furriery or paper making. Practically all of the illustrations are drawn to the same scale (a magnification of 104 diameters) as an aid to rapid comparison, and were all made especially for the book.

NASMITH, J. *The Students' Cotton Spinning, Sixteenth Edition, Revised and Enlarged.* 250 ill., cloth, 622 pp. **\$4.50**

CONTENTS: Evolution of Cotton Spinning; Distribution of Varieties of Cotton; Mixing, Opening and Scutching; Carding; Card Clothing and Grinding; Combing and Drawing; Slubbing and Roving; Theory of Spinning; Mule and Ring Spinning; Reeling, Winding and Manufacture of Thread; Waste Spinning; Arrangement of Drafts and Production.

NASMITH, J. *Recent Cotton Mill Construction and Engineering. Third Edition.* 124 ill., 5 x 7¼, 277 pp. **\$3.00**

CONTENTS: Constructional Details; Slow Burning and One Storyed Buildings; Cost Strength and Fire Resistance of Floors; Fire Appliances; Sprinklers; Lighting; Heating, Ventilation and Humidity; Calculation of Machines in Mill; Steam Boilers and Appliances; Steam Engines; Lighting Engines and Other Accessories; Turbines; Gearing; Shafting and Bearings.

NISBET, H. *Grammar of Textile Design. Second Edition, Revised and Enlarged.* 635 ill., 5½ x 8½, 515 pp. **\$7.50**

CONTENTS: Introduction; The Plain Weave and Its Modifications; Twill and Kindred Weaves; Diamond Weaves; Diamond and Kindred Weaves; Bedford Cords; Backed Fabrics; Fustians; Terry and Loop Pile Fabrics; Gauze and Net Leno Fabrics; Leno Brocade Fabrics; Tissue, Lappet, and Swivel Figured Fabrics, also Ondule Fabrics; Brocade Fabrics; Damask Fabrics; Alhambra and Kindred Fabrics; Piques or Toilet Welts, also Matelasse Fabrics; Toilet Quilting Fabrics; Patent Satin or Mitcheline Fabrics; Tapestry Fabrics, also Kidderminster or Scotch Carpet Fabrics.

PATTERSON, D. *Textile Color Mixing.* A manual intended for the use of dyers, calico printers, and color chemists. *Second Edition, Revised.* 41 ill., 5 plates, 5½ x 8¾, 140 pp. **\$3.50**

CONTENTS: Color a Sensation; Light Waves; Objects Luminous and Illum-

inated; Colors of Illuminated Bodies; Production of Color by Absorption; Diffraction; Dispersion; Fluorescence; Colors of Opaque and Transparent Bodies; Surface Color; Analysis of Light; Spectrum; Homogeneous Colors; Ready Method of Obtaining a Spectrum; Simple Absorption Spectra; Aid of Spectroscope; Examination of Solar Spectrum; Dark Lines; Locality of the Colors; The Spectroscope: Its Construction; Absorption Spectra; Colorists' Use of the Spectroscope. *Color by Absorption.* Absorption of Color Produced by Admixture; Absorption Spectra; Solutions and Dyed Fabrics; Luminosity Curves; Absorption Curves; Dichroism; Dichroic Colored Fabrics in Gaslight; Color Primaries of the Scientist *Versus* the Dyer and Artist; Color Mixing by Rotation and by Dyeing; Secondary and Tertiary Colors; Constants; Hue, Purity, Brightness; Tints, Shades, Scales, Tones, Sad and Sombre Colors; Complementary Colors. *Color Mixing.* Mixing Qualities of Colors; Pure and Impure Green, Orange and Violet; Large Variety of Shades from Few Colors; Consideration of the Practical Primaries, Red, Yellow and Blue; Secondary Colors; Orange; Green; Violet; Nomenclature of Violet and Purple Group; Violet from Rhodamine Pink and Wool Green; Purple; Tints and Shades of Violet; Changes in Artificial Light. *Tertiary Shades.* Broken Hues; Maroons; Browns; Citrines and Olives; Absorption Spectra of Tertiary Shades; Dyed Patterns; Appendix; Four Plates with Dyed Specimens illustrating text.

PATTERSON, D. Color Matching on Textiles. A manual intended for the use of dyers, calico printers, and textile color chemists. 29 ill., $5\frac{1}{2} \times 8\frac{3}{4}$, 140 pp. **\$3.50**

CONTENTS: Light and Color; Structure and Function of the Eye; Daylight for Color Matching; Color Constants; Difficulties in Matching; Reflected Light Examination; Transmitted Light Matching; Color Modifying Influences in Dyed Textiles; Use of Tinted Films; Color Blindness; Matching Dyed Silks and Old Fabrics; Aspect of Shades Under Artificial Lights.

PATTERSON, D. Color Printing of Carpet Yarns. A useful manual for color chemists and textile printers. Ill., $6 \times 8\frac{3}{4}$, 148 pp. **\$3.50**

CONTENTS: Wool Fibre; Yarn Scouring; Scouring Materials; Water; Purification of Lime; Bleaching Carpet Yarns; Colors, Dyes and Color Making; Color Printing Pastes; "Hank" Printing; Yarn Printing; Steaming; Washing; Aniline Colors; Glossary of Drugs and Dye Wares Used in Wool Yarn Printing; Tables.

POLLEYN, F. Dressings and Finishings for Textile Fabrics and Their Application. Translated from the third German edition by Charles Salter. 60 ill., $5\frac{3}{4} \times 8\frac{1}{2}$, 279 pp. **\$3.50**

CONTENTS: The Dressing Process and Materials for Same; Stiffenings and Glazes; Adhesive Dressings; Materials for Soft Dressings; Dressings for Filling and Loading; Antiseptic Dressing Ingredients; Dyeing and Blueing Agents; Various Dressings; The Preparation of Dressing; Recipes for Dressings; Dressings for Linens; Yarn Dressings; Laundry Glazes; Yarn Sizing; Finishing Woolen Goods; Finishing Silk Fabrics; Waterproof Dressings; Fireproof Dressings; Special Finishing Process; the Application of Dressing Preparations; Testing Dressings.

RAYNER, H. Silk Throwing and Waste Silk Spinning.

New Edition in Press

CONTENTS: Raw Silk; The Silkworm; Egg Hatching; Cocoon Reeling and Qualities of Silk; Throwing; Waste Spinning; Wastes; Preparation of Waste for Degumming; Waste Degumming; Opening and Dressing of Wastes; Waste Drawing and Preparing Machinery; Short Spinning Machinery; Spinning and Finishing Processes; Utilization of Waste Products.

REISER, N. Spinning and Weaving Calculations. With special reference to woollen fabrics. Translated from the German by Charles Salter. 34 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 172 pp. **\$5.00**

CONTENTS: Calculating the Raw Material; The Yarn; Reed Calculations;

Calculations for Weaving; Harness Calculations; Finishing and Estimating from Cuttings. *Calculating Full Cost of Goods*. Preliminary Remarks; Various Methods; Special Methods; Calculation of Fabrics Beforehand to Match Samples.

REISER, N. *Faults in the Manufacture of Woolen Goods and Their Prevention.* Translated from the *Second German Edition* by Arthur Morris and Herbert Robson. Ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 186 pp. **\$2.50**

CONTENTS: Improper Raw Material; Wrong Treatment of Material; Improper Setting of Goods in the Loom; Wrong Placing of Colors; Wrong Weight or Width of the Goods; Breaking of Warp and Weft Threads; Errors in Woven Structure; Inequalities, Bands and Stripes; Faulty Borders; Defective Selvedges; Holes and Balloons; Rubbed Places; Creases; Spots; Loose and Bad Colors; Badly Dyed Selvedges; Hard Goods; Brittle Goods; Uneven Goods; Removal of Bands, Stripes, Creases and Spots.

SMITH, W. *Chemistry of Hat Manufacturing.* Lectures delivered before the hat manufacturers' association. Revised and edited by Albert Shonk. Ill., $5 \times 7\frac{1}{4}$, cloth, 131 pp. **\$3.50**

CONTENTS: Textile Fibres, Principally Wool, Fur and Hair; Water, Its Impurities and Their Action; Acids and Alkalis; Boric Acid; Borax; Soap; Shellac; Wood Spirit; Stiffening and Proofing Process; Mordants; Dyestuffs and Colors; Dyeing of Wool and Fur; Optical Properties of Colors.

TAILFER, L. *Practical Treatise on the Bleaching of Linen and Cotton Yarn and Fabrics.* Translated from the French by John G. McIntosh. Ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 318 pp. **\$7.00**

CONTENTS: General Considerations of Bleaching, Steeping, Washing, Lye Boiling, Mather and Platt's Keir; Soap; Bleaching on Grass or on the Bleaching Green or Lawn; Sours; Drying; Damages to Fabrics in Bleaching; Valuation of Caustic and Carbonated Alkali; Chlorometry or Filtration of Decolorizing Chlorides; Chlorine and Decolorizing Chlorides; Water; Bleaching of Yarn; Installation of a Bleaching Works; Energy of Decolorizing Chlorides; Production of Chlorine and Hypochlorites by Electrolysis Bleaching by Ozone.

THORNLEY, T. *Cotton Combing Machines.* 121 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 358 pp. **\$3.50**

CONTENTS: Silver Lap Machine, Ribbon Lap Machine and Draw Frame; Description of Heilmann Comber; Cam Shaft; Detaching and Attaching Mechanism of Comber; Duplex Comber; Resetting of Combers; Erection of a Heilmann Comber; Stop Motions; Various Calculations; Various Notes and Discussions; Cotton Combing Machines of Continental Make.

THORNLEY, T. *Cotton Waste.* Its production, manipulation and uses. 60 ill., $6 \times 8\frac{3}{4}$, 292 pp. **\$3.50**

CONTENTS: Production, Characteristics, and Regulation of Cotton Waste; Treatment of Best Cotton Wastes in Cotton-Spinning Mills, with other notes; Opening and Cleaning of Cotton Waste; Carding of Cotton Waste; Final Spinning Machines for Cotton Wastes; Use of Cotton Waste Yarns in Weaving; Various Notes.

THORNLEY, THOMAS. *Cotton Spinning.* In three volumes. Ill., $5 \times 7\frac{1}{4}$. First Year. 84 ill., 170 pp. **\$1.50**

CONTENTS: Cultivation, Classification, Ginning, Baling and Mixing of the Raw Cotton; Bale-Breakers, Mixing Lattices and Hopper Feeders; Opening and Scutching; Carding.

Second Year. *Third Edition, Revised and Greatly Enlarged.* 112 ill., 315 pp. **\$3.50**

CONTENTS: The Combing Process; The Drawing Frame; Bobbin and Fly Frames; Mule Spinning; Ring Spinning.

Third Year. *Second Edition.* 75 ill., 225 pp. \$2.50

CONTENTS: Cotton; The Practical Manipulation of Cotton Spinning Machinery; Doubling and Winding; Reeling, Bundling and Gassing; Warping, Testing, Commerce and Uses of Yarns; Production and Costs; Main Driving; Arrangement of Machinery and Mill Planning; Waste and Waste Spinning.

TURNER, H. *Worsted Spinners' Practical Handbook.* 54 ill., 5 x 7½, 145 pp. \$3.00

CONTENTS: *Preparing.* Objects; Suitability; Machinery; Points to be Observed; Particulars for Calculating; Turn Off from Preparing Gill Boxes. *Carding.* Worsted Carding; Particulars of Machine; Advantages; Points Requiring Attention; Card Feeding; Action of Hopper Feed; Worsted Card; Driving of Parts; Card Clothing; Foundation; Wire; Character and Shape of Wire; The Setting of Wire into the Foundation; Form of Finished Clothing; Method of Counting Card Clothing. *Combing.* The Balling Punch; Noble's Comb. *Open Drawing.* Particulars of Drawing; Points Influencing Number of Operations; Hints on Gilling and Drawing; Feeding; Levelling up in Drawing; The Turn-off of Machines. *Cone Drawing.* Drafting, Spindle Driving; Bobbin Driving; Lifter Driving; Cone Drawing and Roving. *Spinning.* Counts of Yarn, Draft and Twist; Ratch and Carriers; Twist; Flyer Spinning; Lifter Motion; Calculations for Lifter.

A practicable book, small enough for the pocket, on the daily routine of the worsted spinner's work, so concise and accurate as to be an invaluable companion.

VON GEORGIEVICS, G. *The Chemical Technology of Textile Fibres.*

Their origin, structure, preparation, washing, bleaching, dyeing, printing and dressing. Translated from the German by Charles Salter.

New Edition in Press

CONTENTS: *The Textile Fibres.* Washing, Bleaching, Carbonising. *Mordants and Mordanting.* Dyeing. Theory of Color; Theory of Dyeing; Classification of Dyestuffs; Dyeing on a Manufacturing Scale; Sample Dyeings. *Printing.* Reproductions of Patterns by Direct Printing; Combined Printing and Dyeing; Discharge Style Printing; Reserve Style Printing; Topping Printing. *Dressing and Finishing.* Starch, Gum, Fatty Substances; Hydrosopic Materials; Loading Ingredients; Coloring for the Dressing Preparations; Metals or Their Sulphites; Waterproofing; Fireproofing Antiseptics for Prevention of Mould.

ZIPSER, J. *Textile Raw Materials, and Their Conversion into Yarns.*

Translated from the German by Charles Salter. 302 ill., 6¼ x 8¾, 500 pp. \$5.00

CONTENTS: Raw Materials Used in Textile Industry; Mineral, Vegetable and Animal Raw Materials; Technology of Spinning or Conversion of Textile Raw Material into Yarn; General Review of Various Branches of the Spinning Process; Spinning Vegetable and Animal Raw Materials.

DYES AND DYEING

BARNETT, E. DeB. *Coal Tar Dyes and Intermediates.* 5½ x 8¾, 229 pp. (Industrial Chemistry Series.) \$3.50

CONTENTS: Introduction. *The Intermediate Compounds.* Nitration; Amidation; Sulphonation; Hydroxylation; Miscellaneous Intermediates. *The Dyestuffs.* The Nitroso-Dyes The Nitro-Dyes; The Azo-Dyes; The Diphenylmethane Dyes; The Triphenylmethane Dyes; The Indamines and Indophenols; The Azines; The Oxazines; The Thiazines; The Indigold Dyestuffs; The Anthraquinone Dyes; The Quinoline Dyes; The Acridine Dyes; The Sulphur or Sulphide Dyes. Gives a clear account of the most important synthetic dyes and the intermediate compounds from which they are derived. Being essentially a book on industrial chemistry, information of purely academic interest has been largely omitted.

BARNETT, E. DeB. *Synthetic Dyes.* 5½ x 8¾. (Industrial Chemistry Series.) *In Press*

FAY, IRVING W. *The Chemistry of Coal-Tar Dyes. Second Edition, Revised and Enlarged.* 6 x 9, 500 pp. \$5.00

(Author is professor of chemistry at Polytechnic Institute, Brooklyn.)

CONTENTS: Coal-Tar and its Products. The Hydrocarbons and their Derivatives. The Nitro and Nitroso Dyes. The Triphenylmethane Dyes. Classification of the Coal-Tar Dyes. Azo Dyes. Seven Food Colors. Pyronines. Indomines, Indophenols, Thiazines, Oxazines. Eurhodines and Safranines. Quinoxiline, Quinoline and Acridine Dyes. Aniline Black. Alizarin Dyestuffs. Indigo. Sulphur Dyes. Mordants; Vat Dyes; Thiazol Dyes; Experimental Work.

Intended for those students and dyers who have a good knowledge of general chemistry, and some knowledge of organic chemistry. The object is to present, briefly, the origin and history of coal-tar production, and a discussion of the intermediate products between the coal-tar and the dyes themselves. The methods of making the dyes are taken up, followed by a study of the relations of the great classes of dyes, and also the individual dyes themselves, to one another in the same class. The development of one color from another by a change in its composition is explained, and tables showing the variation of color accompanying change of composition are included. The proof of constitution is in many places given in such detail as to allow the student to comprehend the bases for the structure of the complex molecules of the dyes. The use of mordants and the character of the union between the dyes and animal and vegetable fibres are also included. A few manufacturing processes are introduced here and there in detail, to give clear conceptions of this phase of the subject. Some practical experience to assist in comprehending the theory of the subject is made possible by a course of experiments, the performance of which aids in vivifying this difficult and interesting subject.

SOXHLET, D. H. *Art of Dyeing and Staining Marble, Artificial Stone, Bone, Horn, Ivory and Wood.* Translated from the German by Arthur Morris and Herbert Robson. 5¼ x 7½, 176 pp. \$2.50

CONTENTS: Mordants and Stains; Natural Dyes; Artificial Pigments; Coal Tar Dyes; Staining Marble and Artificial Stone; Dyeing, Bleaching and Imitation of Bone, Horn and Ivory; Wood Dyeing; Varnishes and Polishes.

VON GEORGIEVICS, G. *Chemistry of Dyestuffs.* Translated from the *Second German Edition* by Charles Salter. 6 x 8¾, cloth, 412 pp.

Revised Edition in Press

CONTENTS: Coal Tar; Intermediate Products in the Manufacture of Dyestuffs. *The Artificial Dyestuffs.* Nitroso; Nitro; Azo; Substantive Cotton; Azoxystilbene; Hydrazones; Ketonimides; Triphenylmethane; Rosolic Acid; Xanthene; Xanthone; Flarones; Oxyketone; Quinoline and Acridine; Quinonimide; The Azine Group; Eurhodines; Safranines; Quinoxalines; Indigo; Dyestuffs of Unknown Constitution; Sulphur or Sulphine Dyestuffs; Development of the Artificial Dyestuff Industry; Natural Dyestuffs; Mineral Colors.

WHITTAKER, C M. *The Application of the Coal Tar Dyestuffs.* The principles involved and the methods employed. 5½ x 8¾, 252 pp. (Industrial Chemistry Series.) \$3.00

CONTENTS: General Survey of Dyeing; The Varied Uses of the Basic Dyestuffs; The Application of the Acid Dyestuffs; The Turkey-Red Industry, and Other Uses of the Alizarine Dyestuffs; The Application of the Direct Cotton Dyestuffs, Including Those Which Develop on the Fibre; The Azo-coloring Matters and Their Special Use in Dyeing; The Properties of the Resorcine Dyestuffs; The Application of the Sulphur Dyestuffs; The Application of the Vat Dyestuffs; The Dyeing of Union Materials, Including Garments; Colors Pro-

duced on the Fibre by the Oxidation of Coal Tar Products; Other Uses of Coal Tar Dyestuffs Still in Use; The Valuation and Detection of Dyestuffs.

This book has been written with a view to giving the reader a firm grasp of the chemical principles involved, and the methods used in the application of the coal tar dyestuffs, so that when he commences to carry out dyeing under actual commercial conditions he will know the why and the wherefore of the methods employed.

WOOD, JOHN K. *The Chemistry of Dyeing.* $5\frac{1}{4} \times 7\frac{1}{2}$. 90 pp. (Van Nostrand's Chemical Monographs.) **\$1.00**

CONTENTS: The Chemical Composition and Properties of the Textile Fibers; Dyes and Their Properties; The Nature of the Dyeing Process; Bibliography. A concise and connected account of the work which has been carried out, particularly during the last thirty years, with the object of throwing light on the nature of the dyeing processes.

CANNING AND PRESERVING

HAUSNER, A. *Manufacture of Preserved Foods and Sweetmeats.* A handbook of all the processes for the preservation of flesh, fruit, and vegetables, and for the preparation of dried fruit, dried vegetables, marmalades, fruit-syrups, and fermented beverages, and of all kinds of candies, candied fruit, sweetmeats, rocks, drops, dragees, pralines, etc. Translated from the *Third Enlarged German Edition* by Arthur Morris and Herbert Robson, B.Sc. 28 ill., $5 \times 7\frac{3}{4}$, 231 pp. **\$3.50**

CONTENTS: Causes of Putrefaction of Food; Composition of Food; Decomposition; Various Methods of Preserving; Meats; Eggs; Milk; Fat; Vegetable Foods; Fruits; Manufacture of Jam and Jellies; Manufacture of Candied Fruit; Carmelized Fruit; Bonbon Making; Fruit Drops; Machinery and Appliances for Candy Making; Oils in Candy Making; Recipes, etc.

WAGNER, E. *Recipes for the Preserving of Fruit, Vegetables and Meat.* Translated from the German. 14 ill., 6×9 , 125 pp. **\$2.50**

CONTENTS: *Preserved Fruits.* Canned Fruits; Glazed and Candied Fruits; Marmalades, Jams, and Fruit Juices; Fruit Jellies; Fruit Pulp for Ices; Preserved Vegetables; Preserved Meats.

FOOD INSPECTION—DRUGS

BENNETT, H. G. *Animal Proteids.* $5\frac{1}{2} \times 8\frac{3}{4}$. (Industrial Chemistry Series.) **In Press**

BLYTH, A. W., and BLYTH, M. W. *Poisons: Their Effects and Detection.* *Fourth Edition, Thoroughly Revised, Enlarged and Rewritten.* Ill., $7 \times 9\frac{1}{4}$, 804 pp. **\$8.50**

CONTENTS: Introductory; Classification; Poisonous Gases; Carbon Monoxide; Chlorine; Hydric Sulphide; Acids and Alkalies; Volatile Poisonous Substances Separable by Distillation from Neutral or Acid Liquids; Alkaloids and Poisonous Vegetable Principles Separated by Alcoholic Solvents; Poisons Derived from Living or Dead Animal Substances; Oxalic Acid Groups of Poisons; Inorganic Poisons; Appendix.

BLYTH, A. W., and BLYTH, M. W. *Foods: Their Composition and Analysis.* A manual for the use of analytical chemists and others. With an introductory essay on the history of adulteration. *Sixth Edition, Thoroughly Revised, Enlarged and Rewritten.* Ill., $6\frac{3}{4} \times 9\frac{1}{4}$, 645 pp. **\$8.50**

CONTENTS: History of Adulteration in Various Countries; Introductory;

Carbo-Hydrates; Milk, Cream, Butter, Cheese; Tea, Coffee, Cocoa; Alcohol, Spirits, Fermented Liquors, Wine; Vinegar; Mustard, Pepper, Spices, Condiments; Examination and Water Analysis.

BRUCE, EDWIN M. *Detection of the Common Food Adulterants. Third Edition, Revised and Enlarged.* 5¼ x 7½, 95 pp. \$1.40

CONTENTS: Dairy Products; Meat and Eggs; Cereal Products; Leavening Material; Canned and Bottled Vegetables; Fruits and Fruit Products; Flavoring Extracts; Saccharine Products; Spices; Vinegar; Fats and Oils; Beverages.

For this *Third Edition* the book has been greatly enlarged and added to, so that it now contains the latest and most approved tests for the common food adulterants. It aims to give the qualitative tests for the purity of various foods, and includes a list of the more common adulterants. It will prove, as before, of great help to health officers, food inspectors, chemistry teachers, and all others called upon to test the purity of various foods and food products.

CHRISTIAN, M. *Disinfection and Disinfectants.* Translated from the German by Chas. Salter. 18 ill., 5¼ x 7¾, 112 pp. \$2.50

CONTENTS: *Physical Disinfection.* Heat, Light and Other Rays; Electric Currents and Mechanical Influences. *Chemical Disinfection.* Liquid Disinfectants; Tablets; Gaseous Disinfectants; Combined Systems of Disinfection; Gartner's Method of Disinfecting Books; Formalin Vapor Method.

MACEWEN, HUGH A. *Food Inspection.* A practical handbook. Illus. 6¼ x 9, 264 pp. \$2.50

CONTENTS: The Inspection of Meat, and the Diseases Commonly Met with in the Abattoir, The Construction and Management of Slaughter Houses and Public Abattoirs, and the Law Relating to Slaughter Houses and Markets; The Inspection of Fish, Poultry, Game, Vegetables, Fruit, etc., Considered from a Hygienic Standpoint, and the Law Relating to Unsound Foods; Preservation and Storage of Meat and other Foods, and the Causes of Unwholesomeness in Food.

PAKES, W. C. G., and NANKIVELL, A. T. *The Science of Hygiene.* A text-book of laboratory practice. 80 ill., 5 x 7¾, 175 pp. \$1.75

CONTENTS: Water Analysis. Interpretation of Results. Standard Solutions. Analysis of: Milk; Butter; Flour; Bread; Coffee; Spirits; Wines; Beer; Vinegar; Air; Soils; Disinfectants. Microscopy. Meat Inspection. Appendix.

This new edition of Dr. Pakes' work aims to maintain the standard of excellence set by its predecessor in furnishing a concise and simple laboratory manual, apart from bacteriological methods, for those who work in public health laboratories.

PARRY, ERNEST J. *The Analysis of Food and Drugs.* In two volumes. Ill., 6¼ x 9¾.

Vol. I. *The Analysis of Food and Drugs (Chemical and Microscopical).* 59 ill., 752 pp. \$9.50

CONTENTS: *Foods* Tea, Cocoa, and Chocolate, Cocoa Butter, Coffee; Milk, Cheese, Butter, Lard, Suet, Olive Oil; The Carbohydrate Foods; Spices, Flavoring Essences, etc.; Alcoholic Beverages; Flesh Foods, Extract of Meat, Gelatine; Microscopical Analysis. *Drugs.* Crude Drugs and Certain Galenicals; Drugs Containing Alkaloids, Capable of Approximate Determination; The Essential Oils of the British Pharmacopoeia; The Fixed Oils, Fats, and Waxes of the British Pharmacopoeia; The Chemicals of the Pharmacopoeia; Table of Chemicals.

Vol. II. *The Sale of Food and Drugs Acts, 1875-1907.* 181 pp. \$3.50

CONTENTS: Introduction; The Sale of Food and Drugs Act, 1875; The Sale of Food and Drugs Act Amendment Act, 1879; The Sale of Food and Drugs Act, 1899; The Margarine Act, 1887; The Butter and Margarine Act, 1907.

RIDEAL, S. *The Carbohydrates.* $5\frac{1}{2} \times 8\frac{3}{4}$. (Industrial Chemistry Series.)
In Press

VACHER, FRANCIS. *The Food Inspector's Handbook.* A practical guide for medical officers of health, meat inspectors, army officers, students, and others. *Sixth Edition, Thoroughly Revised and Greatly Enlarged.* 98 ill., colored plates, $5\frac{1}{4} \times 7\frac{3}{4}$, 340 pp.

CONTENTS: The Food Inspector; His Qualifications and Obligations; Statutory Powers; Animals, Carcasses and Butchers' Meats; Diseases of Animals which Render Meat Unfit for Human Food; Diseases of Animals which Depreciate the Quality of the Meat; Mode of Cutting up Meat; Poultry and Game; Fish; Fruits and Vegetables; Corn, Bread and Flour; Milk; Arrowroot and Similar Preparations; Butter and Its Substitutes; Cheese, Lard and Eggs; Tea, Coffee, Cocoa and Sugar; Condiments, Spices, etc.

AGRICULTURAL CHEMISTRY

(Soils and Fertilizers)

AIKMAN, C. M. *Manures and the Principles of Manuring.* Third Edition.
 $5 \times 7\frac{1}{2}$, 623 pp. Reprinting

CONTENTS: Introduction; Fertility of the Soil; Functions Performed by Manures; Nitrogen; Nitrification; Phosphoric Acid; Potash; Farmyard Manure; Guano; Nitrate of Soda; Sulphate of Ammonia; Bones; Mineral Phosphates; Superphosphates; Thomas-Phosphate or Basic Slag; Potassic Manures; Minor Artificial Manures; Sewage as Manure; Composts; Indirect Manures; Gypsum; Salt; Application of Manures; Manuring of the Common Farm Crops; Methods of Application and Mixing Manures; Valuation and Analysis; The Rothmansted Experiments.

BOURCART, E. *Insecticides, Fungicides and Weedkillers.* A practical manual on the diseases of plants and their remedies, for the use of manufacturing chemists, agriculturists, aboriculturists and horticulturists. Translated from the French and revised by Donald Grant. 83 tables, 12 ill., $6 \times 8\frac{3}{4}$, 450 pp. **\$6.00**

CONTENTS: Plant Pathology; Etiology; Animal Parasites; Vegetable Parasites; Microbe Parasites; Balanced Disinfection; Therapeutics; Vegetable Surgery; Prophylaxy; Insecticides, Fungicides, and Weed Killers; Dictionary of Insects Injurious to Plants; Dictionary of Fungoid Diseases of Plants.

CHURCH'S Laboratory Guide. A manual of practical chemistry for colleges and schools, specially arranged for agricultural students. *Ninth Edition, Revised and Largely Rewritten*, by Edward Kinch. Ill., $5 \times 7\frac{1}{2}$, 384 pp. **\$2.50**

CONTENTS: *Chemical Manipulations. Qualitative Analysis.* Method; Solutions; Analytical Schemes; Table of Solubilities; Example. *Quantitative Analysis.* Sampling and Analysis of Manures; Analysis of Soils, Water and Foods; Apparatus.

COLLINS, S. H. *Plant Products and Chemical Fertilizers.* $5\frac{1}{2} \times 8\frac{3}{4}$ 252 pp. (Industrial Chemistry Series.) **\$3.00**

CONTENTS: Introduction. *Fertilizers:* Nitrogen Group of Fertilizers; The Phosphorus Group of Fertilizers; Potassium Group of Manures; Mixed Fertilizers. *Soils.* Soils and Their Properties; Special Soil Improvers; Soil Reclamation. *Crops.* Photosynthesis; The Carbohydrates Produced in Crops; The Oil-Bearing Plants; The Nitrogen Compounds in Plants; Miscellaneous Plant

Products; Produce Variability. *The Production of Meat.* The Foods Fed to Beasts; Calorific Value of Foods; Dairy Products; Future Developments. The raw materials of agriculture are often the waste products of the other industries, and the produce of agriculture again forms the raw material for other industries. This book picks up the story of those industrial waste products which are useful as fertilizers, and carry it on through the soil and crops, until new products are available for industrial uses. The volume covers the cycle from factory to fertilizer, from fertilizer to field, and from field to factory once more.

FRITSCH, J. *The Manufacture of Chemical Manures.* Translated from the French, with numerous notes, by Donald Grant. 69 ill., 108 tables, 6 x 8¾, 355 pp. **\$5.00**

CONTENTS: Phosphoric Acid. Principal Phosphate Deposits. Drying and Enrichment of Phosphates. Historical Review of Superphosphate Manufacture. Theory of Manufacture of Soluble Phosphate. Superphosphate Manufacture. Crushing, Sifting, Drying, and Storing of Superphosphate. Retrogradation. Compound Manures. Manufacture of Phosphoric Acid. Double Superphosphates and Various Products. Manufacture of Bone Dust and of Bone Superphosphate (Vitriolized Bones.) Manufacture of Basic Slag. Nitrogenous Manures. Manufacture of Manure from Animal Waste. Recovery of Nitrogen from Distillery Spent Wash. Manufacture of Cyanamide and of Nitrate of Lime. Nitrogenized Phosphatic Manures. Potassic Manures. Transference and Handling of Raw Materials and Finished Products.

GRIFFITHS, A. B. *A Treatise on Manures, or the Philosophy of Manuring.* A practical handbook for the agriculturist, manufacturer, and student. Ill., 5¼ x 7¾, 469 pp. *Reprinting*

CONTENTS: The Constituents of Plants; Vegetable Physiology; Natural Manures; Artificial Manures; Phosphatic Manures; The Manure Works; Artificial Nitrogenous Manures; Various Mineral Manures; Iron Sulphate as a Manure; Ville's System of Manuring; Application of Manures.

GROSS, E. *Hops, in Their Botanical, Agricultural and Technical Aspect, and as an Article of Commerce.* Translated from the German by Charles Salter. With tables and diagrams. 78 ill., 6¼ x 9, 353 pp. **\$5.00**

CONTENTS: History; The Hop Plant Cultivation; Preservation and Storage; Physical and Chemical Structure of the Hop Cone; Judging Value of Hops; Statistics of Production; The Hop Trade.

INGLE, H. *Manual of Agricultural Chemistry.* *Fourth Edition. In Press*

CONTENTS: The Atmosphere; Soil; Reactions Occurring in Soils; Analysis of Soils; Manures; Analysis of Manures; Constituents of Plants; The Plant; Crops; The Animal; Foods and Feeding; Milk and Milk Products; Analysis of Milk; Miscellaneous Products Used in Agriculture.

JOHNSTON, J. F. W., and CAMERON, CHAS. *Elements of Agricultural Chemistry and Geology.* *Twentieth Edition.* Ill., 5¼ x 8, cloth, 502 pp. **\$2.60**

CONTENTS: Chemical Nomenclature; Constituents of Plants and Animals; Composition of the Atmosphere; Growth of Plants; Soils; Rocks; Improvement of Soils; Lime; Irrigation; Exhaustion of Soils; Germination of Seeds; Assimilation by Plants; Manures; Manuring; Animal Nutrition; Vegetable Foods; Fodder Crops; Seed Furnishing Crops; Roots and Tubers; Milk; Butter; Cheese; Food Rations.

LAMBERT, T. *Bone Products and Manures.* An account of the most recent improvements in the manufacture of fat, glue, animal charcoal, size, gelatine and manures. 21 ill., 6 x 8¾, 162 pp. **\$3.50**

CONTENTS: Bones and Their Products; Glue; Gelatine; Uses of Glue, Gelatine and Size in Various Trades; Soils and Plant Life; Natural Manures; Artificial Manures; Mineral and Other Manures; Analysis of Raw and Finished Products; Tables.

LLOYD, STRAUSS L. Mining and Manufacture of Fertilizing Materials and Their Relations to Soils. Ill., $5\frac{1}{4} \times 8$, 159 pp. **\$2.00**

CONTENTS: Chemistry of Fertilizers; Origin and Composition of Soils; The Relation Between Soils and Fertilizing Materials; Pebble Phosphate Ore Dressing and Milling; Hard Rock Phosphate Ore Dressing and Milling; Phosphorus; Artificial Manure Manufacture; Manufacture of Superphosphate; Compound Manures; Nitrogenous Manures; The Fixation of Atmospheric Nitrogen; Manufacture of Cyanamide and Nitrate of Lime—Experiments with Cyanamide; Potassic Manures—Manufacture from Crude Salt, Feldspar, Sunflower and Kelp Plants; On the Examination of Commercial Fertilizers and Materials; On the Examination of Soils.

MURRAY, J. A. Soils and Manures. 33 ill., $5\frac{3}{4} \times 8\frac{1}{4}$, 367 pp. (Van Nostrand's Westminster Series.) **\$2.00**

CONTENTS: Introductory. The Origin of Soils. Physical Properties of Soils. Chemistry of Soils. Biology of Soils. Fertility. Principles of Manuring Phosphatic Manures. Phospho-nitrogenous Manures. Nitrogenous Manures. Potash Manures. Compound and Miscellaneous Manures. General Manures. Farmyard Manures. Valuation of Manures. Composition and Manural Value of Various Farm Foods.

DAIRY CHEMISTRY

FLEISCHMANN, W. The Book of the Dairy. A manual of the science and practice of dairy work. Translated from the German by C. M. Aikman and R. Patrick Wright. 84 ill., 5 plates. $6\frac{1}{2} \times 8\frac{3}{4}$, 368 pp. **\$4.50**

CONTENTS: Secretion, Properties, and Composition of Milk; Extraction; Immediate Sale; Testing; Milk in Its Relation to Micro-Organisms, Dairying and Bacteriology; Butter Making; Manufacture of Cheese; Fermented Milk; By-Products of Milk; Economic Aspects of Dairying; Margarine and Margarine Cheese; Tables.

MELICK, C. W. Dairy Laboratory Guide. 52 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 134 pp. **\$1.25**

CONTENTS: Cream Separators; Babcock Tester; Lactometer; Acidity of Milk; Pasteurization; Starter Making; Curd; Cream Ripening and Grading; Churning; Tests on Butter; Cheese; Ice Cream; Dairy Bacteriology; Tests for Preservatives and Oleomargarine; Repairing Machinery; Milk Preparations; Disinfectants; Refrigeration; Bookkeeping.

THOMSON, G. S. Milk and Cream Testing and Grading Dairy Products. For school, farm and factory. With an introduction by Samuel Lowe. Ill., $5 \times 7\frac{1}{2}$, 224 pp. **\$2.25**

CONTENTS: Introduction; The Milk Supply; Experiments to Ascertain Fat Variations in Milk; The Milk Standard; Errors in Sampling Milk; Milk Tests for Householders; Pasteurisation; The Separator; Experiments in the Separation of Milk; Fat Testing of Milk and Cream; Cream Testing; Skim Milk Testing; Fat Losses in Buttermilk; Testing Buttermilk; Testing Whey; Testing Condensed Milk; Testing Cheese; Some Errors in Cream Testing, Thermometer Charts; Examinations in Milk and Cream Testing; Bacteriology; Grading Produce; Equipment of Factories for Grading; Butter Grading.

FLOUR MILLING

KOZMIN, PETER A. *Flour Milling.* A theoretical and practical handbook of flour manufacture for millers, millwrights, flour-milling engineers, and others engaged in the flour-milling industry. Translated from the Russian by M. Falkner and Theodor Fjelstrup. 543 ill., 7 x 10, 584 pp. **\$7.50**

CONTENTS: Historical Outline of Flour Milling; General Ideas of the Raw Materials for Flour Production; Preparation of Grain for Grinding; Grinding the Grain; Grading the Product According to Size; Grading the Product According to Specific Gravity; Accessory Appliances and Mechanisms; Milling Diagrams; Construction of Mill Buildings; The Cost of Erecting and of Working Mills.

It is a singular fact that there is no serious modern work on flour milling in the English language. This work is the result of over twenty years of work and study of the technology of milling in nearly all of the flour producing countries of Europe as well as America, and will prove a practical and theoretical text for operative millers and for milling engineers who construct flour mills or design flour milling machinery. The illustrations, because of their large number and detail, should prove especially helpful.

BOTANY

STOPES, M. C. *The Study of Plant Life. Second Edition.* 156 ill., 7 plates, 6 x 9, 214 pp. **\$2.00**

CONTENTS: Life of the Plant. Parts and Uses of a Plant's Body. Specialization. The Five Great Classes. Plants in Their Homes.

A manual on the elements of botany intended for use in teaching the idea that plants "live" and that their activities find expression in the plant world. The author believes that once the idea of their "livingness" is fully realized it is time to go on with the study of the details of the plants body, and then to the communities of plants which grow together, thus making possible the working out from observation of a complete and logical idea of plant life rather than the acquirement of a detailed but fruitless knowledge of barren facts. Only very few scientific terms are included, and these are used where they will be of value as describing things which are not generally noticed.

PHYSICAL SCIENCES

PHYSICS

BOURGOUGNON, A. *Physical Problems and Their Solution. Second Edition.* $3\frac{3}{4} \times 6$, boards, 230 pp. (Van Nostrand's Science Series, No. 113.) **\$0.75**

CONTENTS: Lever; Inclined Plane; Falling Bodies; Pendulum; Hydrostatics, Pressure of Water; Transmitted Pressure; Hydraulic Press; Archimedes' Principle; Specific Gravity; Density; Efflux of Liquids Through Apertures; Floating Bodies; Pneumatics; Barometer; Boyle's Law; Air Pump; Siphon; Acoustics; Reflection of Sound; Vibration of Strings; Musical Sound; Optics; Mirrors; Refraction of Light; Lenses; Heat; Measurement of Heat; Calorimetry; Latent and Specific Heat; Method of Mixtures; Mechanical Equivalent of Heat; Magnetism and Electricity; C. G. S. System; Weights and Measures.

COMSTOCK, D. F., and TROLAND, L. T. *The Nature of Matter and Electricity.* An outline of modern views. Ill., 5×7 , 200 pp. **\$2.50**

CONTENTS: *A Brief Outline of the Modern Theory of Matter. Electricity and Energy.* Introductory; The Ultima Realities; Atoms and Their Behavior; The Nature of Heat and Allied Phenomena; The Electron and Its Behavior; Electrons; Chemical Action, and Light; Electrons and Magnetism; Radioactivity; The Structure of the Atom; Recent Discoveries Concerning Radiation; Atoms and Life. *Fifty-six Sections Discussing in Further Detail Some Problems More Briefly Treated in Part I.*

Gives in broad, schematic form the conception of the structure of the material universe which has developed in the minds of modern students of physical science. The treatment of the subject which is here offered is radically elementary, and is intended to be "popular" if not "literary" in its style. A book of this nature, written in the light of the most recent discoveries, will find a welcome amongst the scientific laity, as well as with scientific or philosophic workers in general whose special fields are perhaps somewhat removed from that of theoretical physics. The work consists of two parts, the first giving a rapid survey of the entire subject, outlining the fundamental conceptions and emphasizing their most significant applications only, while the second retraces the same general field in a slower and less connected way, in order to consider details omitted in the more cursory treatment. The second part is divided into fifty-six sections, each of which is numbered and referred to by its number in the appropriate connection in Part I.

CREHORE, ALBERT C. *The Mystery of Matter and Energy.* Recent progress as to the structure of matter. Ill., $4\frac{1}{4} \times 7$, 170 pp. **\$1.00**

CONTENTS: Introductory; Atomic Constitution of Matter; The Electron; Millikan's Oil-drop Method of Measuring Its Charge; Review of Electrical Progress; Light an Electrical Phenomenon; Hertz' Measurement of the Velocity of Electromagnetic Waves; Detectors; High Frequency Waves on Wires; Electromagnetic Theory; Connection Between the Æther and Matter; Evolution of the Theory; Physical World in Difficult Position; Helmholtz' View; The Role of Faith in Science; Constancy of the Velocity of Light; Michelson and Morley Experiment; Theory of Relativity; New Presentation of the "Clock" Illustration; Other Explanations of the Michelson and Morley Experiment; X-Rays; Discovery of Lane; Work of Moseley; Application of Electromagnetic Theory to Matter *in Its Steady State*; Fundamental Conceptions of Atomic Structure; Average Mechanical Force Between Two Electrical Charges Revolving in Circular Orbits, by the Lorentz and Thomson Forms of Electromagnetic Equations; The Lorentz Forms Give Terms Varying Inversely as the Square of the Distance, and Suggests That This is the Cause of Gravitation; Force Dependent upon the Revolution of the Electrons, and Proportioned to the Sum of the Squares of Their Velocities; Theory of Crystal Structure; The Work of J. Frenkel on Contact Electromotive Force and Surface Tension; Equal Angular moment of Momentum Hypothesis Dis-

carded; Atoms of Oxygen, Sulphur, Chlorine and Bromine Not All Alike in Different Crystals, Though They Have the Same Atomic Weight; Why Crystals Are Almost Incompressible; Calculation of the Bulk Modulus; Comparison with Experimental Values; Departure from the *Steady State* Introduces an Entirely New Set of Phenomena; Energy Transfer; The Nature of Heat; Theory Leads Us to Expect That the Same Bodies When Hot Attract Each Other Gravitationally with Greater Force Than When Cold; Shaw Has Detected a Temperature Coefficient Experimentally; Effects That Produce Changes in the Atoms Themselves; Magnetization; Conduction in Metals; Speculation as to the Kind of Chemical Elements in the Interior of the Earth, Based upon the Gravitational Theory; Probably Hydrogen; Formation of Molecules with Atoms; Planck's Theory; The Constant "h"; Attempt to Throw Some Light upon This Constant by the Use of Electromagnetic Theory; Possible Classification of the Phenomena Based upon a Distinction Between the *Steady State* and the State When There is a Transfer of Energy; Thermo-chemistry; Energy Transfer the Principal Subject Before Us.

CREHORE, A. C. *New Theory of the Atom.* 5 x 7½. *In Press*

ERWIN, MARION. *The Universe and the Atom.* The ether constitution, creation and structure of atoms, gravitation, and electricity, kinetically explained. 58 ill., 5¾ x 8¼, 324 pp. *Reprinting*

CONTENTS: *First Principles.* General Views of the Luminiferous Ether; The Ultimate Substance; The Constitution of Matter in Its Three States; Gases, Liquids and Solids; Different Kinds of Wave Motion as Affected by the Medium of Transmission; Water Waves; General Theory of Wave Motion; Composition of Wave Motion; Stationary Water Waves; Stationary Light Waves; Motion in the Polarized Ray; Heart Throbs of the Universe; Vortex Centres; Particles of Successive Orders; Repulsion of Particles; Light as an Elastic Hoop; Creation of Particles of the First Order, by Rotation of a Polarized Ray; Balmer's Formula a Key to the Structure of the Atom and of the Ether. *The Pan-Cycle Hypothesis: Invisible Composition Light Waves, the Warp and Woof of the Ether Structure and of All Things Material.* The Extent of the Physical Universe; The Two Theories; Convincing evidence of an Average Unlimited Distribution of Suns in Space; The Organization and Maintenance of the Ether Structure by Force Rays Proceeding into Finite Space from the Stars in Infinity, and What That Organization Must Be; Stationary Waves, the Vortices or Standard Ether Particles, which, Arranged in Equilateral Triangular Formation, Make the Medium Elastic in Planes, Homogenous and Isometric; The Standard Ether Flow; The Medium Under High Pressure; The Stress Lines of Successive Orders; Hexigons of the Ether Structure of Ascending and Descending Magnitude; Certain Laws of Fluid Motion Applicable to the Ether: The Action of a Revolving Lawn-Sprinkler, the Key to Atomic Motion; Relation of Flows and Pressure in the Ether Structure; The Origin and Maintenance of Centripetal Force in the Ether; The Radii of Particles of Successive Orders Are Reciprocals; Wave Lengths of Waves Sent off by Ether Particles Set in Revolution; Derivation of Balmer's Formula; The Measure, in Centimeters, of the Side of the Standard Equilateral Triangle of the Ether Structure; Why Light Waves of All Wave Lengths Travel with the Same Velocity; Minimum and Maximum Radii of the Hydrogen Atom; The Creation of the Electron; Its Atomic Weight; Negative and Positive Electricity Explained; The Cause of Gravitation Explained; The Nebula Hypothesis Modified; Symmetrical Atoms in Three Dimensions; The Hot Form of the Hydrogen Atom; The Periodic Law of Atomic Weights; The Atomic Weights of all the Elements Are Close Multiples of the First Seven Prime Radii of the Hexigons of the Ether Structure; Comparison Table; Why the Ether Opposes no Obstruction to the Passage of the Earth Through It; How the Energy Radiated by the Sun is Supplied; Matter is Being Created All the Time; The Cycles in Stellar Creations.

HERING, D. W. *Essentials of Physics for College Students.* A textbook for undergraduates and a lecture course and reference work for teach-

ers and other students of physics. *Second Edition, Revised.* 170 ill.,
 $6\frac{1}{4} \times 9\frac{1}{4}$, 376 pp. **\$2.25**

(Author is Dean Emeritus of the Faculty of the graduate school and Professor of Physics in New York University.)

CONTENTS: Properties of Matter; Mechanics; Heat; Waves and Wave Motion; Sound Potential, Magnetism, Electricity; Light.

Presents the principles of physics with experimental illustrations in a way that is suited to students who have an elementary knowledge of the subject and who desire to extend or refresh their earlier studies, or to college students who have not studied physics before. The subject is presented in its latest developments along with the fundamentals in briefer compass than in any book available. No higher mathematics is required than the elements of algebra, geometry and plane trigonometry. The aim is to give only the essentials of physics for non-technical college students without going into detailed descriptions of apparatus or into elaborate demonstrations of those points that belong chiefly to a critical study such as would be made by a special student of physics. The object is rather to present so much of the subject as might be expected of a scholar who is fitted by it to appreciate the significance of the facts of physics as they present themselves in scientific progress. The experiments outlined require no special style of apparatus and may easily be carried on in institutions where the equipment is scanty or unevenly proportioned.

HURST, H. E., and LATEY, R. T. *Textbook of Physics.* In three volumes.
 $5\frac{3}{4} \times 8\frac{1}{4}$.

Vol. I. Dynamics and Heat. 41 ill., 215 pp. **\$1.50**

CONTENTS: *Dynamics or Mechanics.* Kinematics; Kinetics; Work and Energy. *Statics.* Composition and Resolution of Forces; Hydrostatics. *Heat.* Thermometry; Calorimetry; Melting and Boiling; Vapor Pressure and Hygrometry; Expansion of Solids, Liquids and Gases; Radiation; Convection and Conduction; Kinetic Theory of Gases; Table of Energy Equivalents.

Vol. II. Sound and Light. 104 ill., 183 pp. **\$1.50**

CONTENTS: *Sound.* Wave Motion; Velocity of Sound; Characteristics of Musical Notes; Notes Used in Music; Vibrating Solids; Vibrations of Columns of Gas; Doppler's Principles. *Light.* Photometry; Reflection; Refraction; Optical Instruments; Spectroscopy; Color; Disjecta Membra; Notes on Trigonometry; Table of Lines of Angles; Cosines of Angles; Tangents of Angles.

Vol. III. Magnetism and Current Electricity. 101 ill., 265 pp. **\$1.50**

CONTENTS: *Magnetism.* Magnetic Fields of Force; Magnetic Measurements; Terrestrial Magnetism. *Statical Electricity.* The Laws of Electric Force; Electrostatic Induction; Condensers; Lines of Force. *Current Electricity.* Magnetic Actions of the Current; Action of a Magnet on a Current; Faraday's Laws of Electrolysis; Electro-Motive Force; Ohm's Law; Theory of Electrolysis; Cells; Electromagnetic Induction; The Dynamo; Telegraphs and Telephones; Thermo-Electricity; Electric Lighting Circuits; General Physics; Test Papers.

An elaborate exposition of the science of physics in an attempt to give in one volume all the information needed to be able to pass the examinations given by various of the higher institutions of learning on the subject. A very large number of these examination questions are quoted and their sources indicated. Throughout the book every endeavor has been made to use only the simplest mathematics compatible with accuracy and brevity. A few notes on trigonometry and some useful mathematical tables are included in the work.

PERRIN, JEAN. *Atoms.* Authorized translation by D. L. Hammick. 16
 ill., $5\frac{1}{2} \times 8\frac{1}{2}$, 226 pp. **\$2.50**

CONTENTS: *Chemistry and the Atomic Theory.* Molecules; Atoms; Avogadro's Hypothesis; Molecular Structure; Solution; An Upper Limit to Molecular Size.

Molecular Agitation. Molecular Speeds; Molecular Rotations and Vibrations; Molecular Free Paths. *The Brownian Movement-Emulsions.* History and General Characteristics; Statistical Equilibrium in Emulsions. *The Laws of the Brownian Movement.* Einstein's Theory; Experimental Verification. *Fluctuations.* Smoluchowski's Theory. *Light and Quanta.* Black Bodies. Extension of the Theory of Quanta. *The Atom of Electricity.* *The Genesis and Destruction of Atoms.* Transmutations; Counting Atoms. *Conclusions.*

SHELDON, SAMUEL, and HAUSMANN, ERICH. *Physical Laboratory Experiments, for Engineering Students.* Part I., Mechanics, Sound, Heat and Light. 40 ill., $5 \times 7\frac{3}{4}$, 134 pp. **\$1.25**

(Authors are Professor and Associate Professor of Physics and Electrical Engineering at the Polytechnic Institute of Brooklyn.)

CONTENTS: Radius of Curvature of Lenses by Sphorometer; Measurements of Areas by Planimeter; Acceleration of Gravity of Atwood's Machine; Acceleration of Gravity by Falling Body; Coefficient of Restitution and Hardness by Scleroscope; Moment of Inertia of Rotating Wheel; Study of Harmonic Motion of Rotating System; Stretch Modulus of Elasticity; Shear Modulus of Elasticity; Specific Viscosities of Liquids; Conformity of Air with Boyle's Law; Specific Gravity of Gases with Effusimeter; Calibration Curve of Venturi Meter; Velocity of Sound—Specific Heats of a Gas; Coefficient of Expansion of Gases by Air Thermometer; Specific Heats of Solids; Heat Equivalent of Electrical Energy; Mechanical Equivalent of Heat; Heat of Fusion of Ice; Heats of Combustion of Fuels; Dew-Point and Humidity of Atmosphere; Thermal Conductivity of Metals; Refractive Index of Prism; Focal Lengths of Convex Lenses—Radius of Curvature of Concave Mirror; Calibration of Ocular Scale of Cathetometer; Curvature of Cornea of Eye with Ophthalmometer; Magnifying Power of a Compound Microscope; Wave-lengths of Light by Interferometer; Wave-lengths of Light by Diffraction; Photometric Test of Incandescent Lamp; Tables of Physical Constants.

STEVENS, JAMES S. *Theory of Measurements.* A manual for physics students. *Second Edition, Revised.* Ill., $5 \times 7\frac{1}{2}$ 96 pp. **\$1.25**

(Author is professor of physics in the University of Maine.)

CONTENTS: Notation; Introduction; Measurements; Errors; Probability; The Curve; The Integral; The Arithmetical Mean; A Constant Interval; Weights; The Adjustment of Observations; Short Methods; The Precision of Measurements; Graphic Representation; Precision Measures and Their Derivation; Average Deviation; Probable Error; The Propagation of Errors; The Direct Problem; The Converse Problem; Tractional Method; Best Magnitudes and Ratios; Plotting; Method Illustrated; Construction and Interpretation of Curves; Application to Laboratory Problems; Negligibility; Criteria; Significant Figures; Empirical Formulae and Constants; Types of Curves.

This book may be used in connection with a course in physics either as a text-book from which the student may gain the necessary working knowledge in a short time, or as a laboratory guide covering a longer period of time and going very thoroughly into the subject. The work will be found useful to all students of physics, whether in the academic or engineering course.

TOWNSEND, JOHN S. *The Theory of Ionization of Gases by Collision.* Ill., $6 \times 7\frac{1}{2}$, 99 pp. **\$1.25**

(Author is professor of physics at Oxford.)

CONTENTS: Ionization by Negative Ions; Ionization by Positive Ions; Sparking Potentials in a Uniform Electric Field; Theory of Electric Discharges in Fields of force which are not Uniform.

LIGHT—OPTICS—COLOR

BAKER, A. L. *Thick-Lens Optics.* An elementary treatment for the student and the amateur. Ill., $5\frac{1}{2} \times 8\frac{1}{4}$, 141 pp. **\$1.50**

(Author is professor of mathematics in the Brooklyn Manual Training High School.)

CONTENTS: Surface Refraction. Thin Lenses. Thick Lenses. Combinations of Lenses. Telephoto Lens. Reflexion at Spherical Surfaces. Experimental Observations.

Attempts to answer in a simple and practical way, intelligible to the amateur, the most obtrusive questions regarding the optics of the camera, telescope, and microscope. Particular pains has been taken to reconcile the seemingly contradictory formulæ of different authors into a standard unity. This book for the first time assembles the rules, answers and formulæ for a thick lens into one consistent whole, in a simple, practicable form which will be intelligible and satisfactory to the non-technical reader. It is a working volume with many practical examples, with the standard formulation of procedure very much simplified and with many suggestions for practical observations and measurements and should be invaluable to the owners of microscopes, cameras, etc., who desire to acquire a mastery of the simpler optical properties of their instruments.

COLE, R. S. *A Treatise on Photographic Optics.* Being an account of the principles of optics, so far as they apply to photography. 103 ill., folding plates, $5\frac{1}{4} \times 7\frac{3}{4}$, 330 pp. **\$2.00**

CONTENTS: Light; Elementary Theory of Lenses; Aberration and the Design of Lenses; Lens Testing; Exposure; Stops; Shutters; Enlargement; Reduction; Depths of Focus; Halation.

HATT, J. A. H. *The Colorist.* Designed to correct the commonly held theory that red, yellow and blue are the primary colors, and to supply the much-needed easy method of determining color harmony, together with a system of color nomenclature and other practical information for artists and workers or designers in colors. *Second Edition, Enlarged.* 2 color plates, $7 \times 8\frac{3}{4}$, 95 pp. **\$1.50**

CONTENTS: Light the Source of Color. The Spectrum. The Old Idea of Primary Colors. The Scientific Primary Colors. The Additive Method of Combining Colors by Rays of Light. The Subtractive Method of Combining Colors with Pigments. The Juxtaposit Method with Both. Light and Pigments. Beauty in Color. Harmony versus Contrast in Color. A Full Palette. The Proper Way to Blend Oil Colors for Clean Luminous Effects. Complimentary Colors in Shadows. Surface Texture in Painting. The Proper Colors for Aerial Perspective. Art or Truth in Painting. A Standard Color Code, and Nomenclature.

Gives precise data, whereby a color scheme may be analyzed, and beauty in color appreciated and produced. Contains for the first time in color literature, either scientific or artistic, a complete unity between science and practice as well as a concise and consistent law for color harmony and beauty in color. Although based on scientific principles, it is practical, as simple as possible, and may be understood by all classes of readers.

HURST, G. H. *Handbook of the Theory of Color.* 72 ill., 10 colored plates. $5\frac{1}{2} \times 8\frac{1}{2}$, 160 pp. **\$3.50**

CONTENTS: Color and Its Production; Cause of Color in Colored Bodies; Color Phenomena and Theories; The Physiology of Light; Contrast; Color in Decoration and Design; Measurement of Color.

LUCKIESH, M. *Visual Illusions.*

In Press

LUCKIESH, M. Color and Its Applications. 129 ill., 4 color plates, 6 x 9.
360 pp. **\$3.50**

(Author is physicist with the Nela Research Laboratory National Lamp Works of the General Electric Co.)

CONTENTS: Light; The Production of Color; Color-Mixture; Color Terminology; The Analysis of Color; Color and Vision; The Effect of Environment on Color; Theories of Color Vision; Color Photometry; Color Photography; Color in Lighting; Color Effects for the Stage and Displays; Color Phenomena in Painting; Color Matching; The Art of Mobile Color; Colored Media.

A treatise of the subject of color from the underlying scientific principles to the many applications. The object has been not only to discuss the many applications of color, but to establish a sound scientific basis for these applications. The early chapters are devoted to a discussion of light in Relation to Color and of the Production, Measurements and Analysis of color. Considerable attention is given to the relation of color and vision, the physiological and psychological phenomena of vision being of great importance in every application of color. The later chapters are devoted to the many applications of color. The book is authoritative, well illustrated, and contains many references and a wealth of new material. It was written by an investigator in the general field of color and is therefore not narrowly limited in scope. It fills a distinct gap that has existed on the book shelves.

LUCKIESH, M. Light and Shade and Their Applications. 135 ill., 10 tables,
6¼ x 9¼, 278 pp. **\$3.00**

CONTENTS: The Importance of Light and Shade in Vision and in Many Arts; The Characteristics of Objects; The Shadow; The Cast Shadow; Scale of Values; Influence of Color; Light and Shade in Nature; Light and Shade in Sculpture; Light and Shade in Architecture; Light and Shade in Painting; Light and Shade in Stage-craft; Light and Shade in Photography; Light and Shade in Vision; Light and Shade in Lighting.

This book is a condensed record of several years' research by the author in the science of light and shade. It is the first published work which deals with the science of light and shade in a complete and analytical manner. The author has the faculty of bringing forth scientific facts in such a manner as to be helpful to those interested in the various arts. The book is of extremely wide interest because it deals with the appearances of objects and hence with vision and with lighting. In this respect it is a companion to the author's previous book on "Color and Its Applications." It is well illustrated and represents the first elaborate attempt to formulate the science of light and shade and to correlate it with various arts.

STEINHEIL, ADOLPH, and VOIT, ERNEST. Applied Optics. The Computation of optical systems. Being the "Handbuch Der Angewandten Optik." Translated and edited by James W. French. In two volumes. Ill., 6¼ x 9¼.

Vol. I. Ill., 2 folding plates, 187 pp. **\$5.00**

CONTENTS: The Reflection and Refraction of Light; The Fundamental Properties of a Dioptric System; The Requirements of an Actual Lens System and the Calculation of the Errors to be Eliminated; The Computation of a Lens and the Discussion of Its Image Aberrations; Appendix.

Vol. II. Ill., 6 folding plates, 213 pp. **\$5.00**

CONTENTS: Introductory; Determination of Refractive Indexes; Achromatic Doublet Objectives; Oblique Images; Appendix.

Price for two-volume set, **\$9.00**

PHOTOGRAPHY

HEATH, F. H. Chemistry of Photography.

In Press

CONTENTS: The Scope of the Subject of Photography; Light and Allied Radiations; Photochemical Action and Its Measurement; Historical Sketch of the Development of the Photographic Art; The Latent Photographic Image; The Scientific Treatment of Modern Photographic Materials; Orthochromatic Photography; Exposure of the Photographic Plate or Film; The Common Physical and Chemical Phenomena Involved in the Processes of Photographic Work; The Developing Process; The Processes of Fixation and Washing of Plates and Films; The Method for the Production of Positives on Plates; Intensification and Reduction of Negatives; Processes of Printing in the Salts of Silver; The Methods of Copying and Enlarging from Negatives or Prints; Printing Methods Based on the Use of the Salts of Iron; Printing Methods Based on the Photochemical Action of a Dichromate Mixed with Other Substances; Photomechanical Methods; Color Photography; Flash-Light and Artificial Light Photography; Scientific Uses of Photography.

STEADMAN, F. M. Unit Photography. 10 text ill., 16 plates, $5\frac{1}{2} \times 8\frac{1}{2}$, 265 pp. **\$2.00**

CONTENTS: *Introduction.* Purpose of the Book; Analysis of Present Conditions; Character of Photographic Emulsions. *Actinism.* Time. *Diaphragm Systems.* A New Physical Quantity; The Element of Time; Plane and Solid Angles; The *f* System; Derivation of the Unit Cone; The U. S. or Uniform System; The Unit Diaphragm Scale; Unit Actinometry; The *f/1* Actinometer; Actinic Measurements of and at Surfaces; The Least Visible Tint and the First Appearance Time; The Absolute Actinic Unit; The "Actino"; The Standard Tinting Medium; Tinting Mediums Other Than the Standard. *Problems in Unit Actinometry.* *Unit Sensitometry:* The Speed of Emulsions; The Method as Practiced; The Latitude of Emulsions. *Actinic Contrasts.* Comparison of Different Actinities; The Relation of Actinic Graduation to the Tone Steps of the Picture. *Classification of Subjects as to Their Actinic Contrasts:* Subjects of Minimum, Under-Normal, Normal and Over-Normal Contrast. *The Hurter and Driffield System:* Introduction; A Perfect Negative; The Characteristic Curve; Law of Constant Density Ratios; Measurement of Opacity. *Negative Making:* Development and Fixing; Reduction and Intensification. *Practice:* Actinicity of the Subject; A Practical Analysis of Subjects; Classification of Subjects; The Unit Method of Exposing for Exterior Subjects; The Character of Sun Light in Clear Weather; An Exposure Recompense; The Speed of Plates and Films.

On the basis of a new unit, that of the dimension of solid angle or convergence, the author has established a practical unit of Actinicity for the measurement of the intrinsic actinic intensity of surfaces; light sources and expanses and by these means has developed a scientific method of photographic practice in which exposure is deduced from unit measurements by the simplest, easily comprehended, analytical reasoning.

WATKINS, A. Photography; Its Principles and Applications. 100 ill., *Second Edition.* $5\frac{3}{4} \times 8\frac{1}{2}$, 349 pp. **\$3.00**

(Author is past president of the Photographic Convention.)

CONTENTS: First Principles. Lenses. Exposure Influences. Practical Exposure. Development Influences. Practical Development. Cameras and Dark Room. Orthochromatic Photography. Printing Processes. Hand Camera Work. Enlarging and Slide Making. Color Photography. General Applications. Record Applications. Science Applications. Plate Speed Testing. Process Work (Photo-Mechanical Printing). Pinhole Photography.

ASTRONOMY

BALL, S. R. *Popular Guide to the Heavens.* A series of eighty-three plates, colored and lithographed, with explanatory text and index. *Third Edition.* Ill., 7 x 9, 96 pp. **\$5.00**

CONTENTS: The Celestial Sphere and the Solar System; The Planets and Satellites; The Sun; Eclipses of the Sun and Moon; Comets; The Moon; The Sky; Month by Month and the Index to the Planets; The Star Maps; Star Clusters and Nebulae; Select List of Telescopic Objects; Standard Time.

CHAMBERS, GEORGE F. *Astronomy.* 358 ill., 8 colored plates. $4\frac{3}{4} \times 6\frac{1}{2}$, 350 pp. **\$1.50**

CONTENTS: The Sun. Moon. Tides. The Planets Generally. Most Interesting and Familiar Planets. Less Known Planets. Eclipses. Comets. Shooting Stars. The Stars. Groups of Stars and Nebula. The Constellations. Telescopes. Time and Its Measurement. The Spectroscope Astronomically. Table of the Constellations, with a brief Descriptive Account of Each. Statistics Respecting the Planets and Their Satellites. Catalog of Celestial Objects easy for Small Telescopes. Written especially for the reader, who, without being acquainted with the higher mathematics of the subject, and without fitting up a costly laboratory, would like to have some knowledge of the elementary relations between the heavenly bodies and the every day life of the world. The very large number of excellent illustrations make the book the more interesting.

NOLAN, THOMAS. *The Telescope. Revised and Enlarged.* Ill., $3\frac{3}{4} \times 6$, boards, 128 pp. (Van Nostrand's Science Series, No. 51.) **\$0.75**

CONTENTS: *The Optical Principles Involved in the Construction of the Telescope.* The Simple Refracting Telescope; The Reflecting Telescope; The Compound Refracting, or Modern Aplanatic and Achromatic Telescope; Comparison of Refracting and Reflecting Telescopes; Improvements in the Telescope since 1880. *Bibliography.* Books, Scientific Papers; Periodical Literature.

SHAW, W. N. *Forecasting Weather.* 155 ill., folding maps, charts, $6 \times 8\frac{3}{4}$, 408 pp. **\$3.50**

(Author is director of the Meteorological Office of London.)

CONTENTS: Synoptic Charts. Relation of Wind to Barometric Pressure. Relation of Temperature and Weather to Barometric Pressure. Types of Weather and the Further Outlook in Weather Forecasting. Local Weather in Relation to Weather Type. Physical Processes of Weather. Life History of Surface Air Currents. Relation of Air Currents to Barometric Minima. Trajectories of Air. Minor Fluctuations of Pressure. Line Squalls and Lignes de Grain. Gales and Storm Warnings. Anticyclones and Land Fog. Coastal Forecasts, Sea Fogs and Thunderstorms. Forecasts for Agriculturists. Colliery Warnings. Approach of Depressions. Movement of Depressions. The Upper Air. Statistical Methods for Long Period and Seasonal Forecasting. Practical Utility of Weather Forecasts.

ELECTRICAL ENGINEERING

ELECTRICITY AND MAGNETISM

ASHE, SYDNEY W. *Electricity, Experimentally and Practically Applied.*

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Treats of the fundamentals of electricity in an experimental and practical way, showing, where possible, the direct application of theory to practical engineering, with the aid of simple mathematics. It embodies the details of the successful experimental lectures given by the author to the employees of the New York Edison Co., the Edison Illuminating Co. of Brooklyn, the Edison Illuminating Co. of Boston, the Consolidated Gas, Electric Light and Power Co. of Baltimore, and to the students of the Polytechnic Institute of Brooklyn. The volume is particularly adapted to courses given to practical men and should likewise prove useful as a reference for high schools and college laboratory courses.

ATKINSON, P. *Elements of Dynamic Electricity and Magnetism. Fourth Edition.*

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CLARKSON, RALPH P. *Elementary Electrical Engineering.* A textbook of

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HEAVISIDE, O. Electromagnetic Theory. Three volumes. Ill.

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A scholarly work that will provide the means of solving many of the problems which those engaged in practical electrical industrial operations are called upon to consider, and it should also be of great value to the scientist.

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ROBERTS, JOHN, Jr. Laboratory Work in Electrical Engineering (Preliminary Grade.) A series of laboratory experiments for first- and second-year students of electrical engineering. 108 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 218 pp. \$2.00

CONTENTS: Method of Graphical Representation; Ohm's Law; Measurement of Resistance, E. M. F., and Current; The Potentiometer; Calibration of Electrical Measuring Instruments; Miscellaneous Experiments; Physical Tables.

SWOOPPE, C. WALTON. Lessons in Practical Electricity, Principles, Experiments and Arithmetical Problems. An elementary textbook. *Fifteenth Edition, Revised and Enlarged*, with a new chapter on electric lighting by H. H. Stillman. 404 ill., $5\frac{1}{4} \times 7\frac{3}{4}$, 507 pp. \$2.00

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This book combines the principles of electricity upon which the practical applications of to-day depend, with the experimental demonstration of these principles and the elements of the arithmetic of electricity used in making practical electrical measurements and calculations. Thirty thousand copies of this book have been used in classes for practical men and by individuals, a fact which attests its merit.

WILSON, JOHN F. Essentials of Electrical Engineering. A textbook for colleges and technical schools. 300 ill., 6×9 , 350 pp. \$2.50

(Author is instructor of electrical engineering in the University of Michigan.)

CONTENTS: The Electric Circuit; Magnetism and Magnetic Induction; Practical Construction of the Dynamo; The Continuous Current Generator; The Continuous Current Motor; Losses, Efficiencies and Ratings of Continuous Current Dynamos; Polyphase Alternating Currents; The Alternating Current Generator;

The Synchronous Motor; Current Rectifying Apparatus; The Transformer; Transformer Connections; The Induction Motor; Single Phase Commutating Motors; Electric Lamps; Circuit Interrupting Apparatus; Meters; Power Transmission and Distribution; The Storage Battery; Harmonic Quantities; Inductance; Capacity; The Complex Quantity; Admittance Conductance and Susceptance; Resuscitation from Electric Shock.

A text that aims to emphasize the fact that continuous and alternating currents are subject to the same laws. The fundamental laws of the electric circuit are fully developed before the study of machines is taken up, so that having a thorough knowledge of the electric circuit, the student experiences little difficulty in the physical phenomena that take place in the more common types of electrical apparatus. A knowledge of trigonometry is essential and familiarity with calculus advantageous, but not indispensable.

HANDBOOKS

FOSTER, HORATIO A. *Electrical Engineer's Pocketbook.* A handbook of useful data for electricians and electrical engineers. With the collaboration of eminent specialists. *Seventh Edition, Completely Revised.* 1128 ill., 718 tables, $4\frac{3}{4} \times 7$, full leather, 1636 pp. **\$5.00**

CONTENTS: Symbols, Units, Instruments; Measurements; Magnetic Properties of Iron; Electromagnets; Properties of Conductors; Relations and Dimensions of Conductors; Underground Conduit Construction; Standard Symbols; Cable Testing; Dynamos and Motors; Tests of Dynamos and Motors; The Static Transformer; Standardization Rules; Illuminating Engineering; Electric Arc Lighting; Electric Incandescent Lighting; Electric Street Railways; Electrolysis; Transmission of Power; Storage Batteries; Switchboards; Lighting Arresters; Electricity Meters; Wireless Telegraphy; Telegraphy; Telephony; Electricity in the U. S. Army and Navy; Resonance; Electric Automobiles; Electrochemistry and Electrometallurgy; X-rays; Electric Heating, Cooking, and Welding; Lightning Conductors; Mechanical Section; Index.

The book as now presented shows some corrections of typographical and other errors, together with some new material in the sections and switchboards and units, while the standardization rules of the A. I. E. E. included are the latest. The aim throughout has been to supply in exhaustive and condensed form, the data essential to the engineer engaged in any of the branches of the vast domain of electrical engineering.

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CROCKER, F. B., and ARENDT, M. *Electric Motors: Their Action, Control and Application.* *Second Edition, Revised and Enlarged.* 169 ill., $9\frac{1}{4} \times 6\frac{1}{4}$, 315 pp. **\$2.50**

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Aims to set forth the action and operation of various types of electric motors,

with sufficient comprehensiveness for most persons who study or use these machines, even including students and practitioners who specialize in electrical engineering. The present edition contains many amendments and additions, both in text and illustrations, to make the subject matter clearer and more complete. The work is the outgrowth of a course of lectures at Columbia University. References are made to United States and foreign patents as well as articles and books in which may be found further descriptions of the various machines and methods considered.

FRITH, JULIUS. *Alternating Current Design.* 27 ill., $5\frac{1}{2} \times 8\frac{3}{4}$, 131 pp. **\$2.50**

CONTENTS: Alternating Currents. Armature Reaction. Relation of Dimensions to Output. Example of the Design of an Alternator. Synchronous Machinery in Parallel. Compound Wound Alternators. Induction Motors. Theory. Example of the Design of an Induction Motor. Static Transformers. Example of the Design of a Transformer. Transmission Lines. Choking Coils. Additional Example of the Design of an Alternator. Design of a Smaller Two-Phase Squirrel-Cage Induction Motor and Auto Starter.

GOLDSCHMIDT, RUDOLF. *The Alternating Current Commutator Motor. The Leakage of Induction Motors.* In one volume. 247 ill., $5\frac{1}{4} \times 8\frac{3}{4}$. 220 pp. **\$3.00**

CONTENTS: THE ALTERNATING CURRENT COMMUTATOR MOTOR. Introduction. The Series Commutator Motor. The Thomson Repulsion Motor. The Repulsion Motor of Latom-Winter-Eichberg. Special Types. Examples of Performances of Commutator Motors. THE LEAKAGE OF INDUCTION MOTORS. The Circle Diagram. The No-load Current. The Leakage. The Leakage Factor. General Examples.

HAY, A. *An Introductory Course of Continuous-Current Engineering.* 183 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 337 pp. **\$2.50**

CONTENTS: Electrical Units; Electromagnets; Magnetism; Hysteresis; Measuring Instruments; Dynamo Construction; Dynamo Used as Motor; Construction and Management of Motors; Secondary Cells and Their Uses; The Electric Arc; Mercury Vapor Lamps; Incandescent Lamps; Photometry; Switches; Conductors; Insulation.

LIVINGSTONE, R. *The Mechanical Design and Construction of Generators.* 126 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 228 pp. **\$4.50**

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LOUDIN, M. A. *Standard Polyphase Apparatus and Systems. Sixth Edition, Thoroughly Revised.* 207 ill., $5\frac{1}{2} \times 8\frac{1}{4}$, 369 pp. **\$3.00**

CONTENTS: Definitions of Alternating Current Terms; Generators; Induction Motors; Synchronous Motors; Transformers; Rotary Converters; Motor Generators; Frequency Changers; Other Converting Apparatus; Switchboards; Station Equipment; Lightning Protection; Line Construction; Two and Three Phase Systems; Choice of Frequency; Relative Weights of Copper for Various Systems; Calculation of Transmission Lines.

RAYMOND, E. B. *Alternating Current Engineering Practically Treated. Third Edition, Revised and Enlarged.* 104 ill., $5\frac{1}{2} \times 8$, 252 pp. **\$2.50**

CONTENTS: The General Subject of Magnetism and Alternating Currents; The Transformer; The Compensator; Distribution Systems; Alternating Current Motors; Induction Motors; Repulsion Motor; Alternating Current Generator; Testing; Rotary Converter; Converter vs. Motor Generators.

SHELDON, S., and HAUSMANN, E. *Dynamo Electric Machinery.* Its construction, design and operation. In two volumes.

Vol. I., *Direct Current Machines. Ninth Edition, Revised.* 218 ill., 5½ x 7¾, 337 pp. **\$2.50**

CONTENTS: Electrical Laws and Facts. Magnetic Laws and Facts. Armatures. Field Magnets. Armature Reactions. Commutation. Generators. Efficiency of Operators. Constant-potential Generators. Constant Current Generators. Motors: Shunt Motors. Series Motors. Dynamotors. Motor Generators, Borsters and Storage Batteries. Central Station Equipment.

Vol. II., *Alternating Current Machines. Tenth Edition, Completely Revised.* 236 ill., 5¾ x 7¾, cloth, 364 pp. **\$2.50**

CONTENTS: Properties of Alternating Currents; Self-Induction; Capacity; Alternating Current Circuits; Alternators; The Transformer. *Motors.* Induction Motors; Synchronous Motors; Single-Phase Commutator Motors; Converters; Power Transmission.

Intended as a text-book for the use of students pursuing electrical or non-electrical engineering courses. The method of presentation is considered as especially adapted for classroom exercises, which consist of recitations, computations, and occasional lectures, and which are supplemented by laboratory exercises, the two being correlated with a view to training the mind of the student and adding somewhat to his knowledge. It will be found that in treatment the sequence is such that parts which it may seem undesirable to require from other than electrical engineering students may be omitted without introducing a discontinuity in the matter which remains.

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KINZBRUNNER, C. *Continuous Current Armatures; their winding and construction.* A handbook for students, designers and practical men. 79 ill., 6 x 8½, 80 pp. **\$1.50**

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LIVINGSTONE, R. *Mechanical Design and Construction of Commutators.* 62 ill., 5 x 8½, 93 pp. **\$4.50**

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TRANSFORMERS

FLEMING, J. A. *Alternate-Current Transformer in Theory and Practice.*

Vol. I., The Induction of Electric Currents. *Third Edition.* Ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 611 pp. \$6.50

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This is exclusively a practical book giving an introduction to the practical aspects of transformer design and construction. It points out the application of the various theories set forth by the foremost engineers in their writings, which usually are not available in book form but only scattered through various papers and articles.

DYNAMO ELECTRIC MACHINERY—CARE, REPAIR AND TESTING

BEDELL, FREDERICK, and PIERCE, C. A. *Direct and Alternating Current Manual.* With directions for testing and a discussion of the theory of electrical apparatus. *Second Edition, Greatly Enlarged.* Ill. 6×9 , 373 pp. \$2.00

(Authors are professors of applied electricity in Cornell University.)

CONTENTS: Direct-Current Generators and Motors. Synchronous Alternators. Single-Phase Currents. Transformers. Polyphase Currents. Phase Changers, Potential Regulators, etc. Induction Motors. Induction Machines: Frequency Changers and Induction Generators. Synchronous Machines. Wave Analysis. Problems.

A concise, logically and systematically arranged treatment of the most important tests on direct and alternating-current apparatus, eliminating all superfluous and unessential material. Its terse and clear presentation enables the student quickly to master the essential principles of the subject. It should be in the hands of practicing engineers, especially those engaged in testing; and of college graduates entering upon their professional work.

BOTTONE, S. R. *Electro-Motors, How Made and How Used.* A handbook for amateurs and practical men. *Sixth Edition.* 87 ill., $5 \times 7\frac{1}{2}$, 189 pp. \$1.00

BROADFOOT, S. K. *Motors, Secondary Batteries, Measuring Instruments and Switchgear.* 14 ill., $4\frac{1}{4} \times 6\frac{1}{2}$, 96 pp. (Electrical Installation Manual Series.) \$0.75

CONTENTS: MEASUREMENT OF CURRENT. Instruments. MEASUREMENT OF POWER. Instruments. MOTORS. GENERATORS. Kinds and Classification. Erection of Motors and Dynamos. Care of Machines. Faults. MOTOR STARTERS AND REGULATORS. Mechanical Features. Faults. Fuses. Circuit-Breakers. ACCUMULATORS. Charging. Erecting. Faults. General Hints. Boosters.

CROCKER, F. B., and WHEELER, S. S. *The Management of Electrical Machinery.* A thoroughly revised and enlarged edition of "The Practical Management of Dynamos and Motors." *Eighth Edition.* 131 ill., 5 x 6½, 222 pp. **\$1.00**

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EDDY, L. C. *Laboratory Manual of Alternating Currents.* 21 ill., 5½ x 8, 26 pp. **\$0.50**

(Author is assistant professor of electrical engineering at Norwich University.)

CONTENTS: To Distinguish an Alternating Current from a Direct Current; Effects of Choke Coils upon Alternating Currents; Inductance and Resistance; Frequency Effects; Vector Diagram Analysis; To Determine Frequency; Power in Alternating-Current Circuits; Effects of Condensers upon Alternating Currents; Experiments with Capacity and Inductance; Branched Circuits Containing Reactions; Power and Heat Developed in Circuits Containing Reactance; Alternating-Current Transmission Line Characteristics (Non-Inductive Load); Alternating-Current Transmission Line Characteristics (Inductive Load); Alternating-Current Generator Characteristics; Characteristics of Three-Phase Delta-Connected Systems; Characteristics of Three-Phase Star-Connected Systems; Power in Three-Phase Systems; Rotary Converter (D.C. Side); One Wattmeter Method—Three-Phase System; Power Factor of Squirrel-Cage Induction Motor; Rotary Converter (A.C. Side); Synchronous Motor; Effect upon the Power Factor of a Transmission Line of Variation in the Field Current of a Synchronous Motor Floating on the Line; Single-Phase Motor; Rotor-Wound Induction Motor; Transformer Regulation.

A series of simple experiments on alternating currents for students whose electrical training includes only the essentials of the subject.

JOHNSON, C. H., and EARLE, R. P. *Practical Tests for the Electrical Laboratory.* *In Press*

KINZBRUNNER, CHARLES. *The Testing of Alternating Current Machines in Laboratories and Test Rooms.* A practical work for students and engineers. Vol. I. General Tests; Transformers, Alternators. 141 ill., 5½ x 8¾, 164 pp. **\$2.00**

CONTENTS: Instruments and Apparatus; Resistance Measurements; Measurement of Periodicity, Slip, Power Factor and Power; Phasemeters and Synchronizers; Testing of Transformers; Alternators; Miscellaneous Tests.

MORECROFT, J. H., and HEHRE, F. W. *A Short Course in the Testing of Electrical Machinery. Third Edition, Revised and Enlarged.* 88 ill., 6 x 9, 176 pp. **\$1.75**

(Authors are professor and instructor of electrical engineering in Columbia University.)

CONTENTS: DIRECT CURRENT EXPERIMENTS. "Fall of Potential" along a Conductor Carrying Current; Measurement of Armature Circuit and Shunt Field Resistances; The Shunt Generator; Preliminary Work with a Generator, Magnetization Curve, External Characteristic; The Compound Generator; Armature Characteristic of a Shunt Generator, External Characteristic of a Compound Generator, Effect of Operating a Compound Generator at Speeds Higher or Lower than Rated Value; The Shunt Motor; Speed Characteristics, Commercial Efficiency by Brake Test; The Motor Starting Rheostat; Shunt Motor Efficiency by the Stray Power Method; The Series Motor; Current Torque Curves of Different Types of Motors. Parallel Operation of Shunt and Compound Generators.—ALTERNATING CURRENT EXPERIMENTS. Wave Shape, Power and Power Factor, Effective Values; Properties of the Alternating Current Circuit; The Alternator, Its Characteristics on Non-Inductive and Inductive Load, Prediction of External Characteristic; The Transformer, Operation and Characteristic Curves; Measurement of Losses and Prediction of Efficiency; The Induction Motor: Its Operating Characteristics with and without added Rotor Resistances; The Synchronous Motor: Synchronizing and Phase Characteristics; The Rotary Converter; Effect of Speed and Voltage upon Ratio, Operating Characteristics; Parallel Operation of Alternators; Distribution of Load, Circulating Circuit, etc.; Three-Phase Circuits; Current and Voltage Relations, Measurement of Power.

An analysis in non-mathematical language of the characteristics of the most important types of electrical apparatus with which the practicing engineer might come in contact. The work was written so as to be useful to non-electrical students and engineers.

SEVER, G. F. *Electrical Engineering Experiments and Tests on Direct-Current Machinery.* With diagrams and figures. *Second Edition, Revised and Enlarged.* Ill., $5\frac{1}{2} \times 8\frac{1}{2}$, 66 pp. **\$1.00**

CONTENTS: Resistance Measurements; Preliminary Work with a Dynamo; Characteristic Curves of a Shunt Dynamo; Compound Dynamo-Motor; Commercial Efficiency of a Shunt Motor Using a Brake; Operation of; Series Constant Potential Motor; Shunt Dynamos in Parallel, Compound Dynamos in Parallel, Constant Current Arc Dynamo, Arc Lamps, etc.

SEVER, G. F., and TOWNSEND, F. *Laboratory and Factory Tests in Electrical Engineering. Second Edition, Revised and Rewritten.* 98 ill., $6\frac{1}{4} \times 9\frac{1}{2}$, 281 pp. **\$2.50**

CONTENTS: *Direct Current Tests.* Dynamo Operation; Motor Operation and Efficiency; Dynamo Efficiency; Special Dynamo Operation. *Alternating Current Tests.* Elementary Properties; Alternating Current Generator; Synchronous Machines in Parallel; Tests on Transformers; Curve Tracing; Resonant Rise of Potential; Polyphase Circuits and Transformations; Induction Motor; Rotary Converters; Induction Generator; Frequency Changes. *Electrical Measurements.*

SMITH, C. F. *Practical Alternating Currents, and Alternating Current Testing. Fifth Edition.* 258 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 414 pp. **\$3.50**

CONTENTS: Alternating Electromotive Force and Current; Impedence; Power and Power Factor; Virtual Value of an Alternating Current; Effect of Capacity; The Transformer; Alternators; Synchronous Motors; The Polyphase Circuit; The Rotary Converter; The Polyphase Induction Motor; Single-phase Motors; The Composition of Waves.

SMITH, C. F. *Practical Testing of Dynamos and Motors. Third Edition.* 108 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 322 pp. **\$3.00**

CONTENTS: General Purposes of Tests; Measurements of Armature and Field Resistance; Production of Electromotive Force in a Dynamo; The Magnetic

Circuit; Armature Reactions; Shunt-Wound Dynamo; Series Dynamo; Compound Dynamo; Effect of Current in the Motor Armature; Efficiency Tests of a Motor; Efficiency Tests of a Dynamo; Miscellaneous Tests; Motor Generators and Boosters.

TOWNSEND, F. *Short Course in Alternating Current Testing.* Ill., $5\frac{1}{2} \times 8\frac{1}{2}$, boards, 32 pp. **\$0.75**

CONTENTS: Properties of Circuits; Alternating Current Generator; Determination of an E. M. F.; The Transformer; The Induction Motor; The Synchronous Motor; Rotary Converter; Alternators in Parallel.

ELECTRIC AND MAGNETIC MEASUREMENTS AND MEASURING INSTRUMENTS

EDGCUMBE, KENELM. *Industrial Electrical Measuring Instruments.*

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FLEMING, J. A. *Handbook for the Electrical Laboratory and Testing Room.*

Two volumes. Ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 1160 pp. each, **\$6.50**

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GERHARDI, C. H. W. *Electricity Meters, Their Construction and Management.* A practical manual for central station engineers, distribution engineers, and students. *Second Edition, Revised and Enlarged.* 406

ill., $5\frac{1}{2} \times 8\frac{1}{2}$, 524 pp. **\$7.20**

CONTENTS: Introductory; Alternating-Current Meters; Continuous-Current Meters; Meters Suitable for Both; Prepayment Meters; Double Tariff Meters and Maximum Demand Indicators; Tramcar Meters; Choice of a Type of Meter; Arrangement of a Meter Department; Instruments, Apparatus and Accessories; Meter Testing; Reading and Erection; Meter Cleaning and Repairs; Meter Bookkeeping; Table of Double Square Roots for Use with Lord Kelvin's Standard Electric Balances.

HASKINS, C. H. *The Galvanometer and Its Uses.* A manual for electricians and students. *Fifth Edition, Revised.* $4\frac{1}{4} \times 6\frac{1}{2}$, 75 pp. **\$1.50**

CONTENTS: Resistance; Units of Measurement; Electromotive Force; Flow of Current Galvanometers; Rheostats; Shunts; Tangent, Gaugain, Differential and Sine Galvanometers; Wheatstone Bridge; Formulas for Measurement; Shunts; Wires; Weight of Wires; Tables.

LOCKWOOD, T. D. *Electrical Measurement and the Galvanometer; Its Construction and Uses.* *Third Edition.* 31 ill., 5×7 , 137 pp. **\$0.75**

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PALMER, A. R. *Magnetic Measurements and Experiments.* With answers. 25 ill., $5 \times 7\frac{1}{4}$, 124 pp. **\$0.75**

PARR, G. D. A. *Electrical Engineering Measuring Instruments, for Commercial and Laboratory Purposes.* 370 ill., $6\frac{1}{2} \times 9$, 336 pp. **\$3.50**

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ELECTRICAL CALCULATIONS

ATKINSON, A. A. *Electrical and Magnetic Calculations.* For the use of electrical engineers and artisans, teachers, students and all others interested in the theory and application of electricity and magnetism. *Fourth Edition, Revised.* Ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 310 pp. **\$1.50**

(Author is professor of physics and electrical engineering at Ohio University.)

CONTENTS: Explanation of Units; Relation of Quantities; General Laws of Resistance; Electrical Energy; Wiring for Light and Power; Batteries; Magnetism; Relation of Magnetic Quantities; The E. M. F. of Dynamos and Motors; Calculation of Fields; Elements of Dynamo Design; Alternating Currents; Alternating Current Distribution.

HOBBS, W. R. P. *The Arithmetic of Electrical Measurements.* *Sixteenth Edition, Revised and Edited,* with six additional chapters by A. R. Palmer. Ill., 5×7 , cloth, 129 pp. **\$0.75**

CONTENTS: Introductory; Ohm's Law; Measurement of Current when Cells are in Series; Measurement of Current when Cells are in Parallel; The Effect of a Number of Cells; Current Produced by Cells in Series and Parallel; Best Arrangement of Cells; Current Produced by Cells in Opposition; Measurement of Current by Electrolysis; Measurement of Current by the Tangent and Mirror Galvanometer; Measurement of Resistance Employing Ohm's Law and the Tangent Galvanometer; The Post-Office Box; Resistance Calculated from the Dimensions of Conductors; Specific Resistance; The Variation of Resistance with Temperature; The Measurement of Electro-Motive Force; The Crompton Potentiometer; The Heating Effect of a Current; Electric Lighting and Transmission of Power; Curve Plotting; Miscellaneous Exercises.

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Alternating Currents. Networks. Demonstrations by Calculus. Geometrical Solution of Parallel Circuits. Algebraic Solution of Circuits. Wheatstone Bridge Law. Table of Equivalents.

Very few of the calculations in this book call for the use of higher algebra than is involved in the treatment of Ohm's Law, and the arithmetic employed is simpler than that used in commercial calculations. Where more advanced algebra is required, as in the solution of networks, the matter is placed towards the end; and the complex variable, and the graphic solutions of alternating current problems are omitted as being beyond the scope of the book.

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ATKINS, W. **Common Battery Telephony Simplified.** A book for practical telephone men and students. 150 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 174 pp. **\$1.25**

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FLEMING, J. A. **The Propagation of Electric Currents in Telephone and Telegraph Conductors.** *Third Edition, Largely Rewritten.* Ill., $6\frac{1}{2} \times 9\frac{1}{2}$, 383 pp. *In Press*

(Author is professor of electrical engineering in the University of London.)

CONTENTS: Mathematical Introduction; The Propagation of Electromagnetic Waves Along Wires; The Propagation of Simple Periodic Electric Currents in Telephone Cables; Telephony and Telephonic Cables; The Propagation of Currents in Submarine Cables; The Transmission of High-Frequency and Very Low-Frequency Currents Along Wires; Electric Measurements and Determination of the Constants of Cables; Cable Calculations and Comparison of Theory with Experiment; Loaded Cables in Practice.

STEVENS, E. J. **Field Telephones and Telegraphs for Army Use.** Including an elementary course in electricity and magnetism. *Fifth Edition, Revised and Enlarged.* 95 ill., $5 \times 7\frac{1}{2}$, 167 pp. **\$1.20**

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The art of telephony is now so highly developed and specialized that to present the whole subject comprehensively and exhaustively in one volume is practically impossible. This new work in its aim at thoroughness and dependability therefore treats completely only one of the major branches of telephony covering toll, suburban and long-distance telephone service. The theoretical portions are almost entirely non-mathematical, with the object of appealing not only to the engineer and student, but to the man whose training has been essentially practical. For the same reason purely theoretical considerations are treated, where possible, in connection with their practical applications.

TELEGRAPHY

BAKER, T. THORNE. Telegraphic Transmission of Photographs. 65 ill., 5 x 7½, 151 pp. *Reprinting*

CONTENTS: Attempts at the Solution of the Telegraphic Transmission of Photographs and Pictures. Professor Korn's Selenium Process. Early Work with his Original Receiver. The String Galvanometer. Synchronism. First Experiments. The Early History of Commercial Photo-telegraphy. The Korn Telautograph. Principles of Working. Advantages Over Selenium. Early Work with Line Pictures. Experiments with Telegraph and Telephone Cables. Recent Progress with the Telautograph. The Thorne-Baker System. Differences Between the Telectograph and Earlier Chemical Systems. Electrolytic Records and Currents Transmitted Through Long Cables. The Thorne-Baker Line-balance. Work with the Electrolytic Telectograph. Considerations of the Telephone and Telegraph Lines and Their Influence on Photo-telegraphy. The Telestereograph of M. Belin. The Early Work of Belin. Changes in His System. Recent Experiments. The Transmission of Photographs and Pictures by Wireless Telegraphy.

BRIGHT, CHAS. Telegraphy, Aeronautics and War. Colored folding map. 6 x 9, 418 pp. \$6.00

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BRIGHT, C. The Life Story of Sir Charles Tilson Bright With which is incorporated the story of the Atlantic Cable, and the first telegraph to India and the Colonies. *Revised and Abridged Edition.* 68 ill., 6½ x 9, 498 pp. \$4.50

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FISHER, H. K. C., and DARBY, J. O. H. Student's Guide to Submarine Cable Testing. *Fourth Enlarged Edition.* Ill., 5¾ x 8¾, 252 pp. \$4.00

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HAUSMANN, ERICH. Telegraph Engineering. A manual for practicing telegraph engineers and engineering students. 192 ill., 5½ x 8½, 416 pp. \$3.00

(Author is assistant professor of physics and electrical engineering at the Polytechnic Institute of Brooklyn.)

CONTENTS: Simplex Telegraphy; Duplex Telegraphy; Quadruplex Telegraphy; Automatic and Printing Telegraph; Telegraph Office Equipment and Telegraph Traffic; Miscellaneous Telegraphs; Municipal Telegraphs; Railway Signal Systems; Telegraph Lines and Cables; Theory of Current Propagation in Line Conductors; Submarine Telegraphy; Tables.

Presents in a logical manner the subject of modern overland and submarine telegraphy from an engineering viewpoint, its theoretical and practical aspects being correlated.

LOCKWOOD, T. D. *Electricity, Magnetism, and Electro Telegraphy.* A practical guide for students, operators, and inspectors. *Fourth Edition.* 152 ill., 6 x 9, 375 pp. **\$2.50**

LORING, A. E. *A Handbook of the Electro-Magnetic Telegraph.* *Fourth Edition, Revised.* Ill., $3\frac{3}{4}$ x 6, 116 pp. (Van Nostrand's Science Series, No. 39.) **\$0.75**

MALCOLM, H. W. *The Theory of the Submarine Telegraph and Telephone Cable.* 198 ill., $5\frac{3}{4}$ x $8\frac{3}{4}$, 576 pp. **\$9.00**

CONTENTS: *Introduction.* Mathematical Recapitulation; The Fundamental Cable Constants; Transient and Periodic Phenomena. *Purely Periodic Phenomena—The Telephone Cable.* The Telegraphic Equation and Its Periodic Solution; The Methods of Loading Cables; Discontinuities and Reflexions; Alternating Current Measurements. *Purely Transient Phenomena—The Telegraph Cable.* The Telegraphic Equation and Its Transient Solution; The Part Played by the Signalling Apparatus; Sending Phenomena and the Influence of Leaks. *The Methods of Telegraphic Transmission.* Signalling by Inverse Currents; Sine Wave Transmission. *The Future Progress of Cable Telegraphy.* Distortion and How It is Produced; Present-day Methods of Overcoming Distortion; The Duplexed Cable; The Loaded Telegraph Cable; Appendices.

POPE, F. L. *Modern Practice of the Electric Telegraph.* A technical handbook for electricians, managers and operators. *Seventeenth Edition, Rewritten and Enlarged.* 185 ill., 248 pp. **\$1.50**

CONTENTS: Sources of Electricity; Theory of Quantitative Electrical Measurement; Laws and Conditions of Electrical Action; Laws of Electromagnetism; Telegraphic Circuits; Equipment of American Telegraph Lines; Testing Telegraph Lines; Hints to Learners.

SEWALL, C. H. *Lessons in Telegraphy.* For use as a textbook in schools and colleges, or for individual students. Ill., 5 x $7\frac{1}{2}$, 104 pp. **\$1.00**

CONTENTS: Signals; Morse Alphabet; Apparatus and Circuits Used by Learners; Conductors and Insulators; Three Letter Drill; Short Words of Frequent Occurrence; Numerals; Frequently Occurring Words of Different Lengths; Running Trains by Telegraph; Railway Train Orders; Commercial Telegrams; Receiving; Following Copy and Pen Copying; Study of Isolated Words; Telegraphic Terms; Stock and Bond Quotations; Batteries; Market Reports; Press News; Exercises.

THOM, C., and JONES, W. H. *Telegraphic Connections.* Embracing recent methods in quadruplex telegraphy. 20 full-page plates, some colored. Oblong, $9\frac{1}{4}$ x 6, 60 pp. **\$1.50**

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WILKINSON, H. D. Submarine Cable Laying and Repairing. *New Second and Completely Revised Edition.* 313 ill., $6 \times 8\frac{1}{2}$, 581 pp. **\$6.00**

CONTENTS: Surveying the Route; Principles of Design and Construction; Laying of Submarine Cables; Cable Ship on Repairs; Localization of Breaks and Faults.

YOUNG, J. E. Electrical Testing for Telegraph Engineers. 91 illus., 8 tables, $5\frac{3}{4} \times 8\frac{3}{4}$, 274 pp. **\$4.00**

CONTENTS: Remarks on Testing Apparatus; Measurement of Current, Potential and Battery Resistance; Natural and Fault Currents; Measurement of Conductor Resistance and Insulation Resistance; Corrections for Conduction and Insulation Tests; Measurement of Inductive Capacity; Localization of Disconnections, Earths and Contacts; Correction of Localization Tests; Submarine Cable Testing.

WIRELESS TELEGRAPHY AND TELEPHONY

AUSTIN, L. W., and COHN, L. Pocketbook of Radiotelegraphy. Illustrated, about 600 pp. *In Press*

BANGAY, R. D. The Oscillation Valve. The elementary principles of its application to wireless telegraphy. 110 illustrations. $4\frac{3}{4} \times 7\frac{1}{4}$, 223 pp. **\$2.75**

CONTENTS: General Considerations of Wireless Telegraph Receivers; The Vacuum Valve; The Fleming Valve; General Characteristics of the Three-Electrode Valve; The Application of the Three-Electrode Valve to Receivers; The Valve as a Magnifier; High-Frequency Magnification; The Reaction Principles; The Application of the Three-Electrode Valve to Transmitters; The Theory of the Soft Valve.

BUCHER, ELMER E. Vacuum Tubes in Wireless Communication. A practical text book for operators and experimenters. 148 ill., $6\frac{1}{4} \times 9\frac{1}{2}$, 210 pp. **\$2.25**

CONTENTS: Introduction; The Oscillation Valve in Radiotelegraphy; Practical Applications of the Oscillation Valve; Cascade Amplifications by the Vacuum Valve; The Regenerative Vacuum Valve Amplifier; Combined Regenerative and Cascade Amplification Systems; The Vacuum Tube as a Detector of Continuous Waves; Audio Frequency Tuning Circuits; Special Circuits for the Vacuum Tube; Wireless Telephony; The Dynatron Detector and Oscillator; Appendix.

BUCHER, ELMER E. Practical Wireless Telegraphy. A complete text book of radio communication. *Revised Edition.* Ill., $6\frac{1}{4} \times 9\frac{1}{2}$, 344 pp. **\$2.25**

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ECCLES, W. H. Wireless Telegraphy and Telephony. A handbook of formulæ, data and information. *Second Edition, Revised and Enlarged.* 434 ill., $5\frac{1}{2} \times 8\frac{1}{2}$, 538 pp. **\$8.80**

CONTENTS: *Tables.* Conversion Factors; Standard Times and Time Signals; Mathematical Tables; Mathematical Constants and Formulae; Electrical Units,

Symbols; Resistivity and Other Properties of Elements, Alloys, Electrolytes, Insulators; Dielectric and Discharge Data; Electro-Chemical and Thermo-Electric Data; Screw Threads; Dimensions, Weights and Resistance of Copper Wires, Low and High Frequency. *Formulae.* Capacity; Self-Inductance; Resistance of Conductors at Various Frequencies, with Abacs; Radiation; Vibration, Simple and Damped; Oscillatory Discharge; Forced Oscillations; Coupled Circuits; Alternating Current; The Transformer and Resonance Working; Waves on Wires and Coils. *General Information.* Technical, Experimental and Theoretical on Antennae (Forms, Capacity, Radiation, Resistance); Earths, Towers, Masts and Materials; Propagation of Waves; Efficiency; Strays; Description of Methods of, and Plant for, Generation of Oscillations; Discharges; Quenched Sparks; Arcs; Machines; Frequency Changers; Ionic Tubes, Miscellaneous; The Inductoium; Methods and Apparatus for Detection of Oscillations, Including Detectors, Ionic Tubes, Beat Reception, Relaying Amplifying, Telephone Receivers; Design of High-Frequency Circuits, Sending, Receiving; Descriptions of the Principal Systems of Wireless Telegraphy; Directive Telegraphy; Duplex Telegraphy; Methods of Wireless Telephony; Microphones; Wired Wireless.

FLEMING, J. A. *The Thermoionic Valve and Its Developments in Radiotelegraphy and Telephony.* 144 ill., $5\frac{1}{2} \times 8\frac{1}{2}$, 294 pp. **\$4.00**

CONTENTS: Historical Introduction; The Fleming Oscillation Valve; The Three-Electrode Valve; The Thermoionic Valve as a Generator of Electric Oscillations; The Thermoionic Detector in Radiotelegraphy; The Thermoionic Oscillator and Detector in Radiotelegraphy; Recent Improvements in Thermoionic Apparatus; Appendix.

FLEMING, J. A. *The Wireless Telegraphist's Pocket Book of Notes, Formulae, and Calculations.* 39 ill., $4\frac{1}{2} \times 7\frac{1}{4}$, leather, 360 pp. **\$3.00**

CONTENTS: Mathematical Notes; Units, Dimensions, and Systems of Measurement; High Frequency Resistance and Inductance Measurement; High Frequency Current and Voltage Measurement; Capacity Measurement and Predetermination; Bridge Methods of Measurement of Resistance and Inductance; High Frequency Cymometer Measurements, Wave Lengths and Decrements; Aerials and Electric Radiation; Transmitters and Transmitting Circuits; Receiving Circuits and Detectors; Practical Information for Wireless Operators; Mathematical and Physical Tables.

MASSIE, W. W., and UNDERHILL, C. R. *Wireless Telegraphy and Telephony Popularly Explained.* With a special article by Nikola Tesla. 28 ill., $5 \times 7\frac{1}{2}$, 83 pp. **\$1.00**

CONTENTS: The Secret of Wireless Telegraphy; Principle and Theory; The Apparatus Used; Method of Operating; Historical; Uses of Wireless Telegraphy; Possibilities and Abuses; Wireless Telephony; The Future of the Wireless Art.

MIESSNER, B. F. *Radiodynamics.* The wireless control of torpedoes and other mechanisms. 112 ill., $5\frac{1}{2} \times 8\frac{1}{4}$, 211 pp. **\$2.00**

CONTENTS: The Evolution of Telemechanics, the Art of Controlling Mechanisms from a Distance Through Electrical Conductors; Evolution of Radio Telegraphy, the Art of Signalling to a Distance Through the Natural Media; Practical Wireless Telegraphy; Electrostatic and Combined Induction-Conduction Telegraph Systems; Electromagnetic Wave Systems of Signalling; Possible Control Methods for Radio Dynamics; Sound Waves; Infra-red or Heat Waves; Visible and Ultra-violet Waves; Earth Conduction; Electrostatic and Electromagnetic Induction; Hertzian Waves; The Advent of Wirelessly Controlled Torpedoes; Selectors; Classification of Control Systems; European Control Systems and Apparatus; Torpedo Control Problems; Improvements in Receiving Apparatus; Methods of Obtaining Selectivity; Detectors for Radio Dynamics and Torpedo Control; Means of Amplifying Received Currents; Sensitive Relays for Radio Dynamics; Types of Antennae Suitable for Radio Dynamic Torpedies; Recent Developments.

A general descriptive treatment of radiodynamics, especially in connection

with mechanisms operated at a distance—a treatment that without being overloaded with mathematical technicalities would yet be a clear and scientific summary of the practical experience of inventors in this field. As distinguished from telemechanics and telautomatics analogous and broader subjects which include the control of mechanical movements from afar by whatever means, this work treats only of control systems which utilize the natural media, i.e., ether, air, water, or earth, as the connecting link between the control apparatus and the mechanisms to be controlled.

MONCKTON, C. C. F. *Radio Telegraphy.* 173 ill., $5\frac{3}{4} \times 8\frac{1}{2}$, 272 pp. (Van Nostrand's Westminster Series.) **\$2.00**

CONTENTS: Electric Phenomena; Electric Vibrations; Electromagnetic Waves; Modified Hertz Waves as Used in Radio Telegraphy; Apparatus Used for Charging the Oscillator; Electric Oscillator; The Receiver; The Detecting Apparatus and Other Details; Measurements in Radio Telegraphy; Experimental Station at Elmers End; Lodge Muirhead System; Station at Nauens; Telefunken System; Station at Lyngby; Poulsen System; Portable Stations; Radio Telephony.

MORGAN, ALFRED P. *Wireless Telegraph Construction for Amateurs.* *Third Edition, Revised and Enlarged.* 167 ill., 6 plates, $5\frac{1}{2} \times 7\frac{3}{4}$, 236 pp. **\$1.50**

CONTENTS: Introductory; The Apparatus; Aerials and Earth Connections; Induction Coils; Interrupters; Transformers; Oscillation Condensers and Leyden Jars; Spark Gaps or Oscillators; Transmitting Helixes; Keys; Aerial Switches and Anchor Gaps; Hot Wire Ammeter; Oscillation Detectors; Tuning Coils and Transformers; Receiving Condensers; Telephone Receivers and Headbands; Operation; The Amateur and the Wireless Law; How to Obtain a License; What It Is; How to Comply; How to Secure a License; Apparatus Required in Order to Comply; Full Text of Wireless Law.

Reliable data pertaining to the construction of wireless telegraph apparatus. The author has presented practical information for those who may wish to build, for private use, wireless instruments which are more than toys, but yet not so expensive as the commercial instruments. The book shows the construction of simple, efficient instruments, and at the same time gives enough elementary theory and practical hints to enable the amateur not only to construct apparatus but to design his own.

RUHMER, E. *Wireless Telephony in Theory and Practice.* Translated from the German by J. Erskine-Murray, D.Sc. 145 ill., $6 \times 8\frac{3}{4}$, 225 pp. **\$4.50**

CONTENTS: The Photophone; Sources of Radiation; The Speaking Arc; The Photographophone; Light-Telephony at Useful Distances; Best Working Conditions for Light-Telephony; Closed Circuit Telephony; Electromagnetic Induction Telephony; Spark Telephony; Accelerated Spark Rates; High Frequency Alternators; The Arc as a High Frequency Generator; Poulsen Generator; Multiple Arcs in Air; Applications of the Arc to Telephony; The Duddell Phenomenon; Forced Vibrations; Conclusion; Recent Advances; Bibliography.

SEWALL, C. H. *Wireless Telegraphy.* Its origin, development, inventions and apparatus. *Second Edition, Corrected.* 77 ill., 5 plates, $5\frac{3}{4} \times 8\frac{1}{2}$, 235 pp. **\$2.00**

CONTENTS: Prophecy; Discovery; Achievement; Explanatory; Descriptive; Inventors and Inventions; Comparative Merits of Wireless Telegraphy and of Telegraphy by Wires and Cables and the Commercial Outlook for Each; Nomenclature; Transmitters; Wave-Responsive Devices; Wave-Gates; Shields; Condensers; Inductance Coils; Keys, etc.

STONE, ELLERY W. *Elements of Radiotelegraphy.* 125 ill., 33 plates $5 \times 7\frac{1}{2}$, flexible fabrikoid, 274 pp. **\$2.50**

CONTENTS: Principles of Radiotelegraphy; Electrical Terms; Condensers; In-

ductances; Electro-Magnetic Induction; Alternating Current; Damping and Resonance; Logarithmic Decrement; Wave Length, Frequency, Time Period; The Marconi 1896 Transmitter; Coupled Circuits; Lodge 1898 Transmitter; Theory of Ionization; Spark Gaps; Marconi 1900 Transmitter; The Quenched Spark Gap; The Telefunken Transmitter; The Four Radio Transmitter Circuits; Transmitting Keys; Transformers; Condensers; Modern Spark Gaps; Transmitting Inductances; Antenna Current Ammeter; Antenna Condenser; Antenna Switch; Complete Transmitter; Marconi System; Telefunken System; Kilbourne & Clark System; Haller Cunningham System; Fessenden System; Multitone System; French Postal and Telegraph Department System; Wave Meters; Decremeters; Adjustment of a Modern Transmitter; Undamped Wave Transmitters; The Poulsen Arc Transmitter; Poulsen Arc Keys; Antennae; Various Types of Antennae; Tower Construction; Earth Connections; Antenna Resistance; Wave Propagation; Aerial Communication; Pioneer Receivers; Detectors; Modern Receivers; Receiving Transformers; Receiving Condensers; Telephone Receivers; Audibility Measurements; Harmonic Oscillation of Receivers; The Edison Effect; Electron Tube Detectors; Electric Tube Amplifiers; The Heterodyne; Audion Beat Receiver; Modern Electron Tubes; Magnetic Control; Conclusion; Appendix.

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ABBOTT, A. V. *The Electrical Transmission of Energy.* A manual for the design of electrical circuits. *Fifth Edition, Entirely Rewritten and Enlarged.* Ill., $6\frac{1}{4} \times 10$, 675 pp. **\$5.00**

CONTENTS: Introduction; The Properties of Wire; The Construction of Aerial Circuits; The Construction of Underground Circuits; Special Railway Circuits; Electrical Instruments; Methods of Electrical Measurement; Continuous-Current Conductors; Conductors for Alternating Currents; Series Distribution; Parallel Distribution; Miscellaneous Methods; Polyphase Transmission; The Cost of Production and Distribution.

COLLIS, A. G. *High and Low Tension Switch-gear Design.* 94 ill., and folding plates, 6×9 , 233 pp. **\$3.50**

Contains the result of researches made with the object of obtaining accurate data as to the effects caused by opening and closing the circuits with various types of electrical apparatus. The major portion of this work is expressly intended as an introduction to the main elements of design of both direct and alternating current switch gear, and the treatment is such that the essentials may be easily understood. A number of oscillograph records are given. These are the result of patient perseverance; were obtained only with great difficulty and expense; up to the present are unique; and believed to be the first published records of their kind.

COLLIS, A. G. *Switchgear and the Control of Electric Light and Power Circuits.* 47 ill., $4\frac{1}{4} \times 6\frac{1}{2}$. (Installation Manuals Series.) **\$0.50**

The book contains oscillograph records of the effects of opening and closing various types of switchgear, together with many valuable diagrams. Mathematical treatment has been particularly avoided, and the matter presented in as readable a form as possible, so that the points dealt with may be easily understood without unduly burdening the mind.

CUSHING, Jr., H. C., and HARRISON, NEWTON. *Central Station Management.* Compiled especially for the managers, superintendents and engineers of electric light and power central stations, and is in accordance with the latest accepted practice. $5\frac{1}{4} \times 7\frac{3}{4}$, 417 pp. **\$2.00**

CONTENTS: The Light, Heat and Power Business of Central Stations; Operating Expenses in Electric Lighting; State Protection for Lighting from Competition; Technical Features Governing Cost; Costs and Their Relation to Charges and Pur-

chasing Power; How Central Stations Get Business; "New Business" for Central Stations; The Simplified Rate Problems of Electric Lighting; Financial Considerations Governing Rates; The Basis of Rates for Current; Rates to Charge for Electric Power; What the Rates Must Pay For; The Minimum Rate Charge; Lighting and Bills for Lighting; The Prepayment of Current; Light and Its Cost; Efficiencies in Electric Lighting; General Distribution of Light; Scientific Lighting of City Streets; The Illumination of Interiors; Scientific Lighting of a Home; Accidents Due to Bad Lighting; Rates for Electric Cooking; District Heating from Central Stations; The Advantage of Farming by Central Station Power; Steam in Central Station Use; Management and Care of Boilers; Increasing Boiler Capacities in Central Stations; Increasing the Efficiency of Boilers; Boiler Corrosion in Central Stations; Boiler Furnaces for Central Stations; Electrical Injuries, Cares, etc.

An interesting work showing how many central stations have solved their problems. The authors, because of their association with the periodical "Central Station," have had the opportunity to give close study to the questions brought out in this book.

EDLER, R. *Switches and Switchgear.* Translated by Ph. Laubach. 365 ill., 6¼ x 9, 412 pp. **\$4.00**

CONTENTS: General Remarks on the Design of Switchgear; Connecting Leads; Cable Sockets; Connectors; Copper Bars; Contact Blocks; Bolts; Contact Springs and Brushes; Carbon Contacts; Devices to Eliminate Sparking at the Main Contacts; Switches and Change-Over Switches for Low and Medium Pressure; High-Pressure Switches; Fuses; Self-Acting Switches; Automatic Switches; Circuit Breakers; Time Relays, etc.; Starting and Regulating Resistances; Controllers; Accumulator Switches, etc.

GARRARD, CHAS. C., Ph.D. *Electric Switch and Controlling Gear.* A handbook on the design, manufacture and use of switchgear and switchboards in central stations, factories and mines. 433 ill., 5½ x 8½, 656 pp. **\$6.00**

CONTENTS: Materials and Manufacturing Methods; Apparatus for Making and Breaking Electric Circuits; Apparatus for Preventing a Dangerous Condition of the Current Flowing; Apparatus for Regulating the Amount of Current; Apparatus for Starting and Controlling Electrical Running Machinery; Low and Medium Tension Switchboards; High-Tension and Extra-High-Tension Switchboards; Apparatus for Protecting Electrical Machinery Against Abnormal Electrical Conditions. *Appendices.* National Electric Code; Abstract to Switchgear Requirements; Abstract of American Standardization Rules; I. E. E. Wiring Rules; Switchgear Requirements; Abstract of Board of Trade Regulations in so Far as They Affect Switchgear; Abstract of Factory Rules in so Far as They Affect Switchgear; Abstract of Mining Rules Relating to Switchgear; Abstract of V. D. E. Rules; Standard Symbols.

GEAR, H. B., and WILLIAMS, P. F. *Electric Central Station Distribution Systems.* Their design and construction. *Second Edition, Revised and Enlarged.* 187 ill., 5½ x 7½, 455 pp. **\$3.50**

CONTENTS: Systems of Distribution; Transmission and Conversion; Voltage Regulation; Line Transformers; Secondary Distribution; Special Schemes of Transformation; Protective Apparatus; Overhead Construction; Pole Lines; Overhead Construction: Lines and Accessories; Underground Construction; Cable Work; Distribution Economics; Properties of Conductors; Alternating-Current Circuits.

A comprehensive treatise brought up to date, dealing with the distribution of electricity for electric light and power, from the standpoint of the practical distribution engineer. In this new edition the subject of urban transmission and high-tension distribution has been given a separate chapter. The chapters on overhead and underground construction have been expanded to include the progress made in recent years. The discussion of diversity factor

has been broadened and supplemented by a statement of the relation of diversity to the cost of service, and to rate systems. The discussion of methods of voltage regulation, secondary distribution, special schemes of transformation, and distribution economics, contains matter gathered during the author's fifteen years' experience in the development of the distribution system of the Commonwealth Edison Company of Chicago. The work is devoted almost entirely to American practice.

HOBART, H. M. *Heavy Electrical Engineering.* Ill., 6 x 9¼, cloth. 330 pp. \$4.50

CONTENTS: Overall Efficiency of Generating Stations and the Relation Between Coal Consumption and Outgoing Electrical Energy; Steam Raising Plant; Piston Engines and Steam Turbines; Condensing Plant; Electric Generating Plant; Design of Generating Stations; High Tension Transmission Lines; High Tension Continuous Current Series System; Electric Traction Calculations; Traction Motors and Electrification of Railways.

HUTCHINSON, R. W., Jr. *Long Distance Electric Power Transmission.* Being a treatise on the hydro electric generation of energy, its transformation, transmission, and distribution. *Second Edition.* Ill., cloth, 5½ x 8, 350 pp. \$3.00

CONTENTS: Laws of Hydraulics; Applied Hydraulics; Hydraulic Machines and Accessory Apparatus; Generators, Switches and Protective Devices; Laws Governing the Transmission of Energy; The Transmission Line; Transformers; Converters; Motors; Practical Plants; Distinctive Features of Prominent Long Distance Transmissions.

JAMES, HENRY D. *Controllers for Electric Motors.* A treatise on the modern industrial controller, together with typical applications to the industries. 259 ill., 5½ x 8½, 360 pp. \$3.00

CONTENTS: Introduction; Historical; Design Details; How to Read a Diagram; Methods of Acceleration; Starting Characteristics of D. C. Motors; Speed Control and Dynamic Braking; D. C. Magnetic Contractor Control; A. C. Starters and Controllers; Resistors; Protective Devices; Series Parallel Control; Voltage Control for D. C. Motors; Mine Hoists; Pumps; Machine Tool Controller; Printing, Paper and Rubber Calenders; Steel Mills; Cranes; Car Dumpers; Ore and Coal Bridges; Coke Elevators; Oil Wells; Mine Locomotives.

A comprehensive treatment explaining the principles underlying the operation of industrial controllers so as to be of practical assistance to technical students, operating engineers, purchasers and users of electrical apparatus. The preliminary chapters are quite elementary so as to make an understanding of the fundamentals easy. In the application sections, the processes and methods of operation are described in some detail, as information is always essential to a proper understanding of the control. Many controller troubles arise from the lack of complete information of this nature.

KLINGENBERG, G. *Large Electric Power Stations.* Their design and construction, with examples of existing stations. 180 ill., 7 plates, 7 x 10, 260 pp. \$5.00

CONTENTS: Introduction; Principles for the Construction of Large Electric Power Works, Fundamental Terms, Engine Room, Boiler House, Storage and Transport of Coal, Ash Removal, Switchgear, Position of Power Station, Architectural Features, Summary and Energy Diagram; Comparisons of Costs of Electrical Transmission of Energy and of the Transport of Coal; Economy and Generating Costs in Relation to Capacity and Utility Factor; Markische Electrical Works, Coal Storage and Transport, Boiler House, Engine Room Switchgear, Economic Results Obtained in the Markische Works; Fundamental Data for the Framing of Tariffs, Determination of Prime Costs, Comparison Between Private Supply and Supply from a General Power Station; Second Example of the

Installations of the Victoria Falls and Transvaal Power Company, Ltd., in South Africa, History, Brakpan and Simmerpan Power Stations and Hercules Substation, Preparatory Work for Further Development, Second Part of the Rosher-ville Power Station; Preparatory Work for Further Development, Vereeniging Power Station, Summary.

Deals with the problems of the construction of large electric plants in relation especially to the reduction of full consumption and lowering the price of electric current when supplied consumers. It contains a study of the questions of economy in capital outlay and production. Engineering and financial considerations are treated in their proper relation to each other.

KOESTER, FRANK. *Hydroelectric Developments and Engineering.* A practical and theoretical treatise on the development, design, construction, equipment, and operation of hydroelectric transmission plants. *Second Edition.* 500 ill., $7\frac{3}{4} \times 10\frac{3}{4}$, 475 pp. **\$5.00**

CONTENTS: Investigation. Forest Preservation. Hydraulics. Economy in Development. Gravity Dams. Movable Dams. Fish-ways, Head Race Trenches. Flumes. Tunnels. Syphon System. Racks. Screens. Gates Collecting Basin. Steel, Wooden and Reinforced Concrete Penstocks. Power Plant Arrangement. Excavation. Foundations. Superstructure. Structural Steel. Turbines. Draft Tubes. Regulating Devices. Oiling Systems. Testing Turbines. Generators. Switching Room. Switch-boards. Switch-board Equipment. Wiring Diagrams. Bus Bar. Oil Switches. Relays. Transmission Lines. A. C. Conductors. D. C. Conductors. Strength. Spacing and Size of Conductors. Transposition. Corona Effect. Wooden and Concreted Poles. Reinforced Concrete Poles and Towers. Steel Towers. Economical Spans. Insulators. Wall Outlets. Substations. Transformers. Transformer Connections. Converters. Motor-generators. Frequency Changes. Switch Gear of Substations. Line Protection. Choke Coils. Horn, Multigap and Fluid Lightning Arresters. Description of Eight Hydroelectric Transmission Plants, viz.: two American, one Mexican, one Norwegian, two German, one Swiss-Italian, and one Austro-Hungarian.

KOESTER, F. *Steam Electric Power Plants and Their Construction.* A practical treatise on the design of central light and power stations and their economical construction and operation. *Second Edition.* 340 ill., $8 \times 10\frac{1}{2}$, 455 pp. **\$5.00**

CONTENTS: Location; General Layout; Coal Storage; Condenser Water Supply; Excavation and Foundations; Building; Structural Steel; Architectural Features; Boilers; Mechanical Stokers; Grates; Coal; Combustion; Draft; Flues; Chimneys; Feed Water; Superheaters; Superheated Steam; Piping; Reciprocating Engines; Turbines; Condensers; Pumping Machinery; Oiling System; Electrical Equipment; Design of Small Plants; Testing Power Plants; Descriptive Discussion of Typical American and European Light and Power Plants; Data of Most Recent Plants.

TAYLOR, WM. T. *Calculation of Electric Conductors.* Ill., large folding chart, $8 \times 11\frac{1}{4}$, 34 pp. *In Press*

CONTENTS: The Logarithmic Chart as Applied to Cable Calculation; Practical Examples; Useful Conversions, and Calculating Chart for Electric Cables.

TAYLOR, WM. T. *Electric Power Conductors and Cables; Their Practical Applications.* *In Press*

CONTENTS: Relative Advantages of Overhead and Underground Transmission and Distribution; Conductors; Carrying Capacity of Conductors; Factors Determining Size of Conductors; Calculation of Conductors for Underground Service and Insulated Cable Systems; Treatment of Logarithmic Charts and Vector Relations; Calculation of Conductors for Overhead Service and Bare Conductor Systems; Tables of Wires and Cables.

ELECTRIC RAILWAYS

ASHE, S. W., and KEILEY, J. D. Electric Railways Theoretically and Practically Treated. Fully illustrated.

Vol. I., Rolling Stock, by Prof. Ashe and Mr. Keiley. *Second Edition.*
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CONTENTS: Units-Curve Plotting-Instruments; Analysis of Train Performance; Train Recording and Indicating Instruments; Direct Current Series Railway Motor; Alternating Current Single Phase Motors; Types of Control and Their Operation; Car Bodies; Trucks; Brakes and Braking; Electric Locomotives; Electrical Measurements.

Vol. II. Engineering Preliminaries and Direct Current Substations, by Prof. Ashe. Ill., $5\frac{1}{2} \times 7\frac{3}{4}$, 288 pp. **\$2.50**

CONTENTS: Preliminary Considerations; Determination of Required Motor Capacity; Schedules and Load Diagrams; Power House and Sub-Stations Location; Rotary Converter Sub-Stations; The Rotary Converter; The Transformer; Insulating Oils; Auxiliary Sub-Station Apparatus.

AUSTIN, EDWIN. Single-Phase Electric Railways. 346 ill., 8×11 , 308 pp. **\$5.00**

CONTENTS: The Single-Phase System; The London, Brighton and South Coast Railway; The Midland Railway; The Midi Railway; The Blankanese-Hamburg-Ohlsdorf Railway; The Dessau-Bitterfeld Railway; The Murnua-Oberammergau Railway; The Mittelwald Railway; The St. Polten-Mariazell Railway; The Martigny-Orsieres Railway; The Valle-Maggia Railway; The Rhaetian Railway; The Lotschberg-Simplon Railway; The Rotterdam-Scheveningen Railway; The Thamshavn-Lokken Railway; The Rjukan Railway; The Swedish State Railways; The Parma Single-Phase Tramways; The New York, New Haven and Hartford Railway; The New York, Westchester and Boston Railway; The Spokane and Inland Empire Railway; The Rock Island and Southern Railway; The Hoosac Tunnel Railway; The St. Clair Tunnel Railway.

Devoted to exact and careful descriptions of complete railways and portions of main line railways electrified on the single-phase system, of which there are two in England and a great number in Europe and six in the United States.

DAVIES, F. H. Electric Power and Traction. Ill., $6 \times 8\frac{1}{2}$, 293 pp. (Van Nostrand's Westminster Series.) **\$2.00**

CONTENTS: Generation and Distribution of Power; Electric Motors; Application of Electric Power; Collieries; Engineering Workshops; Textile Factories; Printing; At Sea; On Canals; Electric Traction; Overhead System and Track Work; Conduit System; Surface Contact; Car Building and Equipment; Electric Railways.

GANT, L. W. Elements of Electric Traction for Motormen and Others. 38 ill., $5\frac{1}{2} \times 8\frac{3}{4}$, 217 pp. **\$2.50**

CONTENTS: Introduction; Principles of Magnetism; Principles of Electricity; Principle of the Dynamo; Principle of the Continuous-Current Motor Power and Power Measurement; Mechanics of Traction; Characteristic Properties of Continuous-Current Motors; Application of Motors to Traction; Brakes.

HOBART, H. M. Electric Trains. 88 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 220 pp. *Reprinting*

LIVERMORE, V. P., and WILLIAMS, J. How to Become a Competent Motorman. Being a practical treatise on the proper method of operating a street railway motor car; also giving details how to overcome

certain defects. *Second Edition, Entirely Rewritten and Enlarged.*
52 ill., 5 x 6½, 247 pp. \$1.00

CONTENTS: Accidents; Brakes; Circuits; Circuit Breakers; Cars; Air Compressor; Car Control and Controllers; Electrical Current; Motor Defects; Lamps; Lightning Arrester; Railway Signals; Switches; Electrical Terms; Troubles; "Don'ts" Electrical Units; Valves.

PARSHALL, H. F., and HOBART, H. M. *Electric Railway Engineering.*
437 ill., 8 x 11, 463 pp. \$7.50

CONTENTS: Tractive Resistance at Constant Speed; Acceleration; Tractive Force and the Power and Energy at the Axles; Characteristics of Electric Railway Motors; Section Characteristics; Construction of Load Curves; Electrical Power Generating Plant; High Tension Transmission System; Sub-Stations; Distributing System; Rolling Stock; Locomotives and Motor Carriages and Their Electrical Equipment; Trucks.

SAYERS, H. M. *Brakes for Tramway Cars.* 6 x 9, 76 pp. \$1.25

CONTENTS: Importance and Function of Tramway Car Brakes; Classification; Coefficients of Static and Sliding Friction; Wheel Brakes; Hand and Mechanical, Electrical, Their Theoretical and Actual Effectiveness; Influence of Rail Conditions; Sanding and Cleaning; Mechanical and Magnetic Track Brakes; Combined Track and Wheel Brakes; Adjustment and Maintenance of Brakes; General Conclusions as to Choice and Use of Brake; A Typical Accident; Useful Tables and Data.

SHELDON, SAMUEL, and HAUSMANN, ERICH. *Electric Traction and Transmission Engineering.* *New Edition in Press*

(Authors are in charge of the department of physics and electrical engineering at Polytechnic Institute, Brooklyn.)

CONTENTS: Determination of the Number and Size of Cars for an Urban Road. Tractive Effort Required for Car Propulsion. Types and Performance Curves of Motors. Speed Curves. Railway Motor Control. Energy Consumption. The Distributing System. Substations. Transmission Lines. Steam and Hydraulic Power Stations.

The essential facts to be considered in determining the final elements of a complete electric traction system are here carefully presented so as to present a perspective view of the installation from the cars to the power station. The nature and sequence of the various problems involved are indicated, and methods for their solution are suggested and illustrated.

ELECTRIC LIGHTING

ATKINSON, PHILIP. *Elements of Electric Lighting.* Including electric generation, measurement, storage and distribution. *Tenth Edition.*
Fully Revised and New Matter Added. Ill., 5 x 7½, 280 pp. \$1.50

CONTENTS: Electricity a Mode of Molecular Motion; Principles of the Dynamo; Direct Current Dynamos; Alternating Current Dynamos; Electrical Terms and Units; Electrical Measurements; The Arc Lamp; The Incandescent Lamp; The Storage Battery; Distribution.

AYRTON, H. *Electric Arc.* With numerous figures, diagrams and plates.
Ill., 6 x 8¾, 479 pp. \$5.50

CONTENTS: Appearance; History; "Striking" and Sudden Variations of Current; Curves Involving P. D., Constant Current, and Length of Arc; Area of Crater and Crater Ratios; Variations of P. D. with Diameter of Cored Carbons Constant Current Resistance Curves; Constant P. D. Curves; The Equation for

P. D., Current, and Length of Arc with Solid Carbons; P. D. Between Each Carbon and the Arc; Fall of Potential; Relation Between E. M. F. of Generator, Resistance in Series with Arc, P. D., Current and Length of Arc; Power Efficiency; Hissing Arcs; Light and Luminous Efficiency of the Arc; Mechanism of the Arc; Reasons for Different Effects with Solid and Cored Carbons.

BARHAM, G. B. *The Development of the Incandescent Electric Lamp.* 25 ill., 2 plates, 10 tables, $5\frac{3}{4} \times 8\frac{3}{4}$, 206 pp. **\$2.50**

CONTENTS: Some Earlier Forms of Incandescent Lamps. The Carbon Filament Lamp. Improvements in the Carbon Filament Lamps. The "Metalized" Filaments. Tantalum and the Tantalum Lamp. Tungsten and Tungsten Ores. The Tungsten Lamp. Just-Hanaman Method of Making Filaments. The Tungsten Lamp. The Colloidal Method of Making Filaments. The Amalgam and Plating Methods of Making Filaments. Methods of Making Filaments from Powdered Tungsten. Other Methods, Manufacturing Processes and Early Discoveries. Osmium and the Osmium Lamp. Silicon and the Helion Lamp.

CHILD, CLEMENT D. *Electric Arcs.* Experiments upon the arc between different electrodes in various environments and their explanation. 58 ill., 5 x 7, 203 pages. **\$2.00**

(Author is professor of physics in Colgate University.)

CONTENTS: Introduction; Arc in Air between Carbon Electrodes; Arc in Air between Other Substances than Carbon; Arc with Pressures Greater or Less than Atmospheric Pressure in Other Gases than Air; Mercury Arc; Alternating Current Arc; Photometry of the Electric Arc; Use of Arc in Wireless Telephony; Theory of the Electric Arc.

A discussion of the electric arc giving special attention to the explanation of the phenomena and to those investigations that were made in recent years. A rather full account is given of the experiments on the mercury arc and the discussion of the more recent theories.

JEHL, F. *The Manufacture of Carbons for Electric Lighting and Other Purposes.* 83 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, cloth, 232 pp. **\$5.00**

CONTENTS: Physical Properties of Carbon; Historical Notes; Facts Concerning Carbon; Modern Process of Carbon Manufacture; A "New" Raw Material; Gas Generators; Furnace; Estimation of High Temperatures; Gas Analysis; Building a Carbon Factory; Capital Necessary; Soot or Lampblack; Soot Factories; American Methods of Manufacture.

JOHNSON, J. H. *Arc Lamps and Accessory Apparatus.* 29 ill., $4\frac{1}{4} \times 6\frac{1}{2}$, 132 pp. (Electrical Installation Manual Series.) **\$0.75**

CONTENTS: General Principles of Illumination. Open Type Arc Lamps. Enclosed Arc Lamps. Carbon Flame Lamps. Transforming Apparatus. Sealing and Protective Apparatus. Methods of Suspension and Switchgear. Lamp Adjustments and Faults. Application of Arc Lamps. Metallic Flame Arcs.

The Manufacture of Electric Light Carbons. A practical guide to the establishment of a carbon factory. *New Edition.* Ill., $5\frac{1}{2} \times 8$. **\$1.00**

CONTENTS: Preparation of Material; Drying Rooms; Firing the Carbons; Saturating; Coring; Description of Plant Required; Cost of Plant; Cost of Materials and Labor; Estimated Profit.

NERZ, F. *Searchlights: Their Theory, Construction and Application.* Translated by Charles Rodgers. 47 ill., 6 x 8, 145 pp. *Reprinting*

CONTENTS: Historical; Theoretical Considerations; Performance of Searchlights; Testing of Searchlight Mirrors; Applications of Searchlights in the Field, in the Land Fortress, for Coast Defence, on Battleships; Details of Construction; The Shunt Lamp—Remote Control—Signalling Gear—The Iris Shut-

ter—The Disperser—The Double Disperser—Searchlights for Special Purposes; Transportable Power Supply: Power-wagon with Steam Turbine—Power-wagon with Petrol or Alcohol Motor—Power-wagon with Petroleum Motor.

PALAZ, A. *A Treatise on Industrial Photometry.* With special application to electric lighting. Authorized translation from the French by George W. Patterson, Jr., and M. R. Patterson. *Second Edition, Revised.* Ill., $6\frac{1}{4} \times 9\frac{1}{4}$, 334 pp. **\$4.00**

CONTENTS: Principles of Photometry; Photometers; Photometric Standards; General Equipment and Auxiliary Apparatus of Practical Photometry; Electric Lights; Distribution and Measurement of Illumination.

RASCH, E. *Electric Arc Phenomena.* Translated by K. Tornberg. 52 ill., 5×7 , 187 pp. **\$2.00**

CONTENTS: General Outline of Electric Arc Phenomena; The Typical Carbon Arc; External Phenomena; Arc Adjustment; Typical Electrode Materials and their Physical Properties; Theory of Electrical Discharges through Gases; Spark Discharges; Empirical Results; Voltage and Current Conditions in the Arc; Distribution of Energy in the Arc; Efficiency of Commercial Types of Arcs.

Gives in clear and concise form practically all that modern physics has to say about the Electric Arc. This information is carefully classified, so that the inventor or manufacturer can readily utilize it, each theory or physical fact being fully set forth, together with tables of constants or curves embodying recent experimental results. Everything that is likely to be useful is discussed, e.g., thermal conductivity and specific heat of mixtures of electrode materials, theories of light, etc. Pure carbon arcs, flame carbon arcs, mercury vapor arcs and metallic oxide arcs all receive attention. In most cases references are given to original papers.

REY, JEAN. *The Range of Electric Searchlight Projectors.* Translated by J. H. Johnson, M. Inst. E. E. 27 ill., 6 extra full-page illus., $7 \times 10\frac{1}{2}$, 165 pp. *Reprinting*

CONTENTS: Determination of the Luminous Flux Emitted by an Electric Arc; Theoretical Illumination Obtained with a Specified Reflector; Efficiency of Electric Searchlight Projectors; Practical Value of the Illumination by Searchlight Projectors; Searchlights with Mangin Mirrors; General Law Giving the Value of the Range of an Electric Searchlight Apart from the Visual Sharpness; Practical Application of the Law of Ranges Apart from the Visual Sharpness; Practical Examples and Problems in Respect of the Range Variation in the Range with the Size of the Searchlight and the Atmospheric Transparency; Visual Sharpness; Appendix.

SOLOMON, MAURICE. *Electric Lamps.* 112 ill., $6 \times 8\frac{1}{2}$, 339 pp. (Westminster Series.) **\$2.00**

CONTENTS: The Principles of Artificial Illumination; The Production of Artificial Light; Photometry; Methods of Testing; Carbon-Filament Lamps; The Nernst Lamp; Metallic-Filament Lamps; The Electric Arc; The Manufacture and Testing of Arc Lamp Carbons; Arc Lamps; Miscellaneous Lamps; Comparison of Lamps of Different Types.

WIRING FOR LIGHT AND POWER

CRAIG, J. W., and WOODWARD, W. P. *Questions and Answers About Electrical Apparatus.* Illustrating general points and information concerning testing, operation, troubles and defects of electrical apparatus. *Third Edition, Revised and Enlarged.* Ill., $4\frac{1}{2} \times 6\frac{3}{4}$, leather, 256 pp. **\$1.50**

CONTENTS: Systems; Illuminating Engineering; Incandescent Lamps; Arc

Lamps; Direct Current Motors; Alternating Current Motors; Constant Potential Transformers; Constant Current Transformers; Mercury Arc Rectifiers; Meters and Instruments; Interior Wiring; Exterior Wiring; Central Station Operation and Apparatus; Wire Table.

DEVEY, R. G. *Mill and Factory Wiring.* 128 ill., 8 tables, $4\frac{1}{4} \times 6\frac{1}{2}$, 209 pp. (Electrical Installation Manuals Series.) **\$1.00**

CONTENTS: Methods of Wiring; Wiring and Connections for Electric Power and Light; Wiring Calculations and Tables; Tables; Lay-Out of Wiring Network in Factories.

MONTGOMERY, J. H. *Electric Wiring Specifications.* $4 \times 6\frac{1}{2}$, 140 pp. **\$1.00**

(Author is professor of physics and electrical engineering, University of Southern California.)

CONTENTS: *Introduction. Directions for Use. Wiring Specifications.* General Conditions; Description; Labor and Workmanship; Materials; Generators and Motors; Switchboard; Service Entrance. *Special Specifications.* Fixtures; Wiring Exposed to Moisture; Wiring in Show Windows; Motors on Grounded Trolley Service; Moving Picture Machines; Bell Wiring. *Schedule of Lights and Conductors. Illumination Data. Inspection and Superintendence.*

These specifications are arranged for convenient use by architects and contractors who may be called upon to draw up a set of specifications for electrical work and haven't the necessary information at hand. It is intended to provide good modern construction for work of comparatively small extent. The text is so written and indexed that the typist may copy directly from the book and have a correctly worded and arranged set of specifications.

REDFERN, J. B., and SAVIN, J. *Bells, Indicators, Telephones, Fire and Burglar Alarm.* 85 ill., $4\frac{1}{4} \times 6\frac{3}{4}$, 123 pp. (Electrical Installation Manuals Series.) **\$0.75**

CONTENTS: Electric Bells. Push Buttons. Polarized Bells. Bell Circuits. Fire Alarm Apparatus. Indicators and Indicator Circuits. Direct Working Telephones. Battery Call Telephones with Induction Coil. Magneto-Telephones. Inter-Communicating Telephones. Cables. Telephone Switchboards.

WALKER, SYDNEY F. *Electric Wiring and Fitting For Plumbers and Gasfitters.* 94 ill., $5 \times 7\frac{1}{2}$, 168 pp. **\$2.50**

CONTENTS: Introductory; The Insulation of Wires, Their Protection, Fixing, etc.; Fixing Wires and Cables; Lamps; Switches, Fuses, Distribution Boards, etc.

WRIGHT, J. *Testing, Fault Localization and General Hints for Linemen.* 19 ill., $4\frac{1}{4} \times 6\frac{1}{2}$, 88 pp. (Electrical Installation Manuals Series.) **\$0.50**

CONTENTS: Testing by Telephone. The Megger and Its Uses. Surface Leakage. "Guard-Wire" Principle in Insulation Testing. Applications of the Mil-Ammeter. Repairing Broken Metal Filaments. Resistances and Artificial Loads. Polarity. Fuse Hints. Uses of the Voltmeter. Measuring Galvanometer, and Battery Resistance. Short Circuits. Bell Circuits. Telephone Circuits. Lamps and Lighting. The Nodon Valve. Finding Resistance of Wire Coil. Condensers. Flexible Conductors. Care of Testing Apparatus. Testing H. P. by Prony Brake. Ohm's Law. Wheatstone Bridge. Lampholders and Wall-Sockets. Earthing. A Home-Made Galvanometer.

WIRES AND CABLES

DEL MAR, WILLIAM A. Electric Power Conductors. *Second Edition, Revised.* 69 ill., 6 x 9, 330 pp. \$2.00

(Author is assistant engineer, electrical transmission department, New York Central Railroad.)

CONTENTS: *Wires and Cables. Materials and Gauges.* Materials; Wires; Cables. *Electrical Properties.* Resistance of Wires and Cables; Resistance of Networks; Skin Effect; Carrying Capacity. *Insulation and Insulated Conductors.* Insulation; Insulated Cables; Insulators. *Determination of Size for Given Voltage Drop and Power Loss.* Voltage and Systems of Distribution; Lamp Wiring Calculations; Continuous Current Railway Feeder Calculations; Negative Booster Calculations; Alternating Current Feeder Calculations; Economical Size of Conductors and Kelvin's Law. *Determination of Size for Given Stress in Spans.* *Specifications. Tests. Installation.* Underground Lines; Overhead Lines; Splicing. *Depreciation and Deterioration.* Depreciation; Deterioration by Electrolysis and Miscellaneous Causes. *Third Rail Circuits. Rail Bonds. Tables of Inductance and Capacity. Appendices.* Basis of B. & S. Gauge. Basis of Skin Effect and Carrying Capacity Formulæ; Method of Calculating Thickness of Rubber Insulation; Basis of Direct and Alternating Current Transmission Formulæ; Basis of Formulæ for Stresses in Spans; Explanation of Specifications; Basis of Tables and Inductance.

DWIGHT, HERBERT B. Transmission Line Formulas for Electrical Engineers and Engineering Students. 27 ill., 5 x 7, 143 pp. \$2.00

CONTENTS: *Working Formulas.* Regulation Chart; Introduction; Elements of a Transmission Line; Regulation Chart; Formulas for Short Lines; "K" Formulas; Convergent Series. *Theory.* Conductors; Transmission Line Problems; Reactance of Wire. Single Phase; Skin Effect; Reactance of Cable. Single Phase; Reactance of Two-Phase and Three-Phase Lines; Capacity of Single-Phase Line; Capacity of Two-Phase and Three-Phase Lines; Theory of Convergent Series. *Tables.*

A compilation of a set of instructions for engineers, that will enable them to make electrical calculations for transmission lines with the least possible amount of labor. The *Theory* has been placed separately in the second part of the work for reference and contains the derivation of the principal formulas used in connection with transmission lines.

FOWLE, FRANK F. The Protection of Railroads from Overhead Transmission Line Crossings. 35 ill., 5½ x 7¾, 75 pp. \$1.50

CONTENTS: What the Dangers are. Effects of Failure of High-tension. Transmission Line at Railroad Crossings. Examples of High-tension Practice in Line Construction. Failures of High-tension Lines. Failure of Poles, Cross-arms and Pins. Failure of Phase-wires and Insulators. Ruin Caused by Break of High-tension Wire. Screen Protection. Bridge and Catenary Types of Reinforced Crossing. Underground Crossings. Insulation Used by Different Companies on Three-conductor High-tension Cables. Discussion of Proposed Type of Crossing. Classification of Crossings by Voltage. Sleet Load, Wind Pressure. Corrected Wind Velocities—Miles per Hour. Observed Wind Velocities. Temperatures. Factors of Safety. Structures. Foundations. Insulators. Conductors. Separation of Conductors. Dead Ending and Tying. Ground Cable. Low Voltage Circuits on the High-tension Line. Conclusions. List of References to the Transactions of the American Institute of Electrical Engineers.

KAPPER, F. Overhead Transmission Lines and Distributing Circuits. Their design and construction. Translated by P. R. Friedlaender. 297 ill., 2 plates, 7¾ x 10, 310 pp. \$4.00

CONTENTS: Conductor Materials; Sag and Tension of the Line; Design of the Supporting Structures; Stability of Poles and Masts; Forces of the Foundation

Block; Fixing the Poles in the Ground; Concrete and Cement Foundation Work; Pole Construction; Overhead Line Insulators; Attachment of the Insulators to Their Pins; Attachment of the Wire to the Insulator; Joints and Branch Connections on the Line; Arrangement of the Wires; Earthing; Crossings Over Postal Wires, Railways, and Roads; Erection of Poles and Masts; Erecting the Wire; Rules and Hints for the Design and Erection of Overhead Lines; Instruments for Surveying and Laying Out the Route of a Line; Surveying the Route of a Transmission Line; The Most Economical Length of Span; Comparison of the Various Supporting Structures with Reference to the Minimum Annual Charges; Local Overhead Distributing Systems; Agreements with Contractors; Tools and Appliances; Regulations Dealing with the Erection and Operation of Overhead Lines.

PERRINE, F. A. C. *Conductors for Electrical Distribution.* Their manufacture and materials, the calculation of circuits, pole line construction, underground working and other uses. *Second Edition, Revised.* Ill., $6\frac{1}{2} \times 9\frac{1}{2}$, 294 pp. **\$3.50**

CONTENTS: Conductor Materials; Alloyed Conductors; Manufacture of Wire; Wire; Finishing and Insulation; Cables; Classification; Calculation of Circuits; Kelvin's Law of Economy in Circuits; Multiple Arc Distribution; Alternating Current Calculation; Overhead Lines; Pole Lines; Line Insulators; Underground Conductors.

RAPHAEL, F. CHAS. *The Localisation of Faults in Electric Light and Power Mains.* With chapters on insulation testing. *Third Revised Edition.* 128 ill., $5\frac{1}{2} \times 8\frac{1}{2}$, 210 pp. **\$3.50**

CONTENTS: Introductory; Insulation Testing of Low-Pressure Networks During Working; Insulation Testing of High-Pressure Mains During Working; Loop Methods of Fault Localising; Fall of Potential Methods; Induction Methods; General Notes as to the Application of Methods; Discontinuities and Short-Circuits; Tramway Feeders; Miscellaneous Methods and Particular Cases; Duplicate Feeders and Automatic Systems of Mains Protection; Proofs of Formulae; Legal Standard Wire Gauge; Standard Sizes of Conductors for Electric Supply Mains.

RUSSELL, ALEXANDER. *The Theory of Electric Cables and Networks.* Ill., $6 \times 8\frac{1}{2}$, 280 pp. **\$3.00**

CONTENTS: Fundamental Principles; Conductivity; Insulativity; Distributing Networks; Insulation Resistance of House Wiring; Insulation Resistance of Networks; Faults in Networks; Dielectric Strength; The Grading of Cables; The Heating of Cables; Electrical Safety Valves; Lightning Conductors.

WEBB, H. L. *A Practical Guide to the Testing of Insulated Wires and Cables.* *Sixth Edition.* 38 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 124 pp. **\$1.00**

CONTENTS: Principles of Testing; Galvanometers; Keys; Resistance Boxes; Bridges; Condensers; Testing Batteries and Accessories; Battery Connections; Testing of Galvanometer; Insulation; Tests for Capacity and Conductor Resistance; Connections of Permanent Set of Testing Instruments; General Remarks; Records of Tests.

INDUCTION COILS, ELECTROMAGNETS, ETC.

GRAY, J. *Electrical Influence Machines; their historical development and modern forms, with instructions for making them. Second Edition, Revised and Enlarged.* 105 ill., 5 x 6¾, 296 pp. \$2.00

CONTENTS: General Sketch of the Phenomena and Leading Principles of Static Electricity; Historical Development; Description of the Following Machines: Varley and Toepler's, Holtz, Wimshurst, Lord Kelvin's, Pidgeon, and Compressed Air; Theory of Influence Machines; Practical Construction of Influence Machines.

HALLER, G. F., and CUNNINGHAM, E. T. *The Tesla High-Frequency Coil: Its Construction and Uses.* 56 ill., 5½ x 8, 121 pp. \$1.25

CONTENTS: General Survey. The Transformer. The Condenser. The Oscillation Transformer. The Interrupter. The Construction of the Boxes. Assembling. Theory of the Coil. Uses of the Coil. Dimensions of a Seven Inch Standard Coil. Appendix.

No attempt has been made to give a mathematical explanation of the oscillation transformer, and other parts of the high-frequency apparatus, for the simple reason that the theory is too complex, and when obtained of no practical use. Neither have the authors tried to lead the amateurs, who are just learning to string bells and connect batteries, from the elements of the galvanic cell up to the working of a high-potential, alternating current, but have merely made an effort to place in the hands of advanced amateurs in electrical science a practical working manual on the construction of high-frequency coils, now so useful in scientific investigation.

UNDERHILL, CHARLES R. *Solenoids, Electromagnets and Electromagnetic Windings. Second Edition, Thoroughly Revised.* 224 ill., 5 x 8, 363 pp. \$3.00

CONTENTS: Introductory. Magnetism and Permanent Magnets. Electric Circuit. Electromagnetic Calculations. The Solenoid. Practical Solenoids. Iron-clad Solenoid. Plunger Electromagnets. Electromagnets with External Armatures. Electromagnetic Phenomena. Alternating Currents. Alternating Current Electromagnets. Quick-acting Electromagnets, and Method of Reducing Sparking. Materials, Bobbins and Terminals. Insulation of Coils. Magnet Wire. Insulated Wires. Electromagnetic Windings. Forms of Windings and Special Types. Heating of Electromagnetic Windings. Tables and Charts.

Mr. Underhill is favorably known for his experimental and practical work on this subject, from which he has deduced laws. These, when published in the technical journals, were very favorably received. In this new work these laws and their applications are clearly explained, and it should be welcomed by the electrical profession generally as well as by the manufacturers of electrical apparatus.

X-RAYS AND RADIUM

JONES, HARRY C. *The Electrical Nature of Matter and Radioactivity. Third Edition, Revised.* 55⅘ x 8¼, 220 pp. \$2.00

(Author is professor of physical chemistry at Johns Hopkins University.)

CONTENTS: The Electrical Conductivity of Gases; The Determination of the Mass of the Negative Ion in Gases; Nature of the Corpuscle; The Electrical Theory of Matter; The Nature of the Atom in Terms of the Electron Theory; The X-rays; The Discovery of Radium; Other Radioactive Substances in Pitchblende; The Alpha Rays; The Beta and Gamma Rays; Other Properties of the Radiations; Production of Heat by Radium Salts; Emanation from Radioactive Substances; Helium Produced from the Emanation; Induced Radioactivity; Production of Radioactive Matter; Theoretical Considerations;

SODDY, F. Radioactivity. An elementary treatise from the standpoint of the disintegration theory. 40 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 226 pp. *Reprinting*

CONTENTS: Radiation Phenomena; Radioactive Elements; Uranium, Thorium, Radium, Polonium and Actinium; Electrical Properties of Gases; Measuring Radioactivity; Alpha, Beta and Gamma Rays; Uranium X and Thorium X; The Radioactive Emanation of Thorium; The Theory of Atomic Disintegration; Radioactive Properties of Radium; The Material Properties of the Radium Emanation and Its Transmutation into Helium; The Energy of Radioactive Change; Anticipations.

ELECTRIC BATTERIES

COOPER, W. R. Primary Batteries: Their Theory, Use and Construction. *New and Enlarged Edition.* 215 ill., 6×9 , 450 pp. **\$6.00**

CONTENTS: Historical; The Simple Voltaic Element; Local Action Polarisation; Theory of the Voltaic Cell; Non-Chemical Cells and Thermopiles; Testing Cells; One-Fluid Cells; Two-Fluid Cells; Dry Cells; Standard Cells; Selenium Cells; Carbon Consuming Cells and the Commercial Generation of Electrical Energy.

ELECTROCHEMISTRY AND ELECTROMETALLURGY

BONNEY, G. E. The Electro-platers' Handbook. A practical manual for amateurs and students in electro-metallurgy. *Fifth Edition, Revised.* 61 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 237 pp. **\$1.50**

CONTENTS: Electro-Deposition of Metals; Electro-Deposition by Current from Batteries; Dynamo-Electric Plating Machines; Electro-Platers' Materials; Electro-Plating with Silver, Gold, Nickel, Copper Alloys, Zinc, Tin, Iron, etc.; Electrotyping; Appendix.

GORE, G. The Art of Electrolytic Separation of Metals. (Theoretical and Practical.) 106 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 317 pp. **\$4.50**

CONTENTS: Chief Electrical Facts and Principles; Thermal Phenomena of the Electrolytic Separation of Metals; Chemical Facts and Principles; Chemico-electric or Voltaic Action; Electrochemical Action; Generation of Electric Current by Dynamo Electric Machines; Establishing and Working an Electrolytic Copper Refinery; Other Applications of Electrolysis in Separating and Refining Metals.

HERING, CARL, and GETMAN, FREDK. H. Standard Table of Electro-Chemical Equivalents and Their Derivatives. With explanatory text on electro-chemical calculations, solutions of typical practical examples and introductory notes on electrochemistry. Ill., $4\frac{1}{8} \times 5\frac{5}{8}$, flexible fabrikoid, 140 pp. **\$2.00**

CONTENTS: Fundamental Laws; Fundamental Data and Description of the Tables. Table 1. Electrochemical Equivalents by Weight. Table 2. Grams per Ampere-hour in the Order of Magnitude. Table 3. Electrophysical Equivalents by Volume. Table 4. Valences of the Elements in Their Combinations; Calculations Involving Electrochemical Equivalents; Examples; Electrolysis; Theory of Electrolytic Dissociation; Faraday's Law; Coulometers; The Electron Theory; *Appendix.* Valence; Elementary Principles of Chemical Reaction and Calculations; Conversion Factors Used in Electrochemical Calculations; Glossary of Terms.

This is the first and only book containing the standard data on electrochemical equivalents and describing how to apply them in practice. It contains the most complete table of electrochemical equivalents ever published, based on the

latest and best internationally adopted standard constants, accompanied by detailed descriptions, with typical examples, of the methods of making the calculations for electrolytic baths, batteries, electrochemical reactions in general, etc. Also a brief outline of the principles and theories involved. It is written in an easily understood style and is intended to serve both as a reference book and as a treatise on this kind of calculations, for the engineer, chemist, electrochemist, electroplater, teacher and student. It will prove to be valuable and time-saving to all who have to deal with such calculations either in practice or as teachers and students, as also those who are interested in the principles involved.

KERSHAW, J. B. C. *Electrometallurgy.* 61 ill., 6 x 8½, 303 pp. (Van Nostrand's Westminster Series.) **\$2.50**

CONTENTS: Aluminum; Bullion and Gold; Calcium Carbide and Acetylene Gas; Carborundum; Copper; Ferro-Alloys; Glass and Quartz Glass; Graphite; Iron and Steel; Lead; Miscellaneous Products; Nickel; Sodium; Tin; Zinc.

RIDEAL, ERIC K. *Industrial Electrometallurgy, Including Electrolytic and Electrothermal Processes.* Ill., 5½ x 8¾, 259 pp. (Industrial Chemistry Series.) **\$3.00**

CONTENTS: Introduction; Electrolysis in Aqueous Solutions; Electrolysis in Fused Electrolytes; The Electrolytic Preparation of the Rarer Metals; Electrothermal Processes; Carborundum and Oxysilicides of Carbon; The Carbides; Electrothermal Nitrogen Fixation by Metals and Metallic Compounds; Iron and the Ferro-Alloys; Appendix.

Among the many branches of applied chemistry electrochemistry has shown a great technical development, and in this book an endeavor has been made to indicate both the limits and possibilities of the application of electrolytic and electrothermal methods in this domain.

URQUHART, J. W. *Electro-plating.* A practical handbook on the deposition of copper, silver, nickel, gold, brass, aluminum, platinum, etc. *Sixth Edition.* Ill., 5¼ x 7½, 238 pp. **\$2.00**

CONTENTS: The Plating Room; Preparation of Articles; Chemicals and Materials; Batteries; Galvanometer; Dynamo-Electric Machines; Deposition of Copper, Silver, Gold, Nickel and Other Metals; Dynamo Machine Working; Improvements in Nickel Plating Processes.

URQUHART, J. W. *Electrotyping.* A practical manual forming a new and systematic guide to the reproduction and multiplication of printing surfaces, etc. 5¼ x 7½, cloth, 236 pp. **\$2.00**

CONTENTS: Metals Used by Electrotypers; Sources of Electricity; Solutions; Depositing and Moulding Apparatus; Moulding Materials; Preparation of the Work; Depositing Process; Hard Facings for Electrotypes; Final Preparation of the Work.

WATT, A. *Electro-plating and Electro refining of Metals.* Being a new edition of Alexander Watts' "Electro-Deposition." Revised and largely rewritten by Arnold Philip. *Second Edition, Revised.* 160 ill., 6¼ x 8, 704 pp. **\$5.00**

CONTENTS: Batteries; Thermopiles; Cost of Electrical Installations for Small Output for Electroplating; Electro-Deposition of Copper; Deposition of Gold by Simple Immersion; Electro-Deposition of Gold and Silver; Various Gilding Operations; Imitation Antique Silver; Electro-Deposition of Nickel, Tin, Iron, Zinc and Other Metals and Alloys; Recovery of Gold and Silver Waste from Waste Solutions; Mechanical Operations Involved in Electro-Deposition; Materials Used; Electro-Plating.

WATT, A. *Electro-metallurgy Practically Treated. Fifteenth Edition, Considerably Enlarged.* Ill., 5 x 7½, 235 pp. **\$1.00**

CONTENTS: Electro-Deposition of Copper, Silver, Gold, Brass, Bronze, Zinc, and Iron; Electro-Metallurgical Cabinet.

ELECTRICITY IN MINING

DUNCAN, W. G., and PENMAN, D. *The Electrical Equipment of Collieries.* 157 ill., 6½ x 9, 329 pp. **\$5.00**

CONTENTS: General Principles, Magnetism, Units, Cells; Dynamos and Motors; Transmission and Distribution of Power; Prime Movers; Lighting by Electricity; Initial Outlay and Working Cost of Electrical Installations; Electricity Applied to Coal-Cutting; Electric Haulage, Winding and Locomotives; Electric-Power Drills and Underground Coal Conveyors; Typical Colliery Electrical Installations; Miscellaneous Applications of Electric Current; Comparison of the Different Modes of Transmitting Power; Dangers Occurring from the Use of Electricity in Collieries.

FREUDMACHER, P. W. *Electrical Mining Installations.* 36 ill., 4¼ x 6¼, 102 pp. (Electrical Installation Manual Series.) **\$1.00**

CONTENTS: General Principles; Generating Plant; Generating Station Switch gear; Transmission; Underground Cables and Fittings; Electric Haulage and Pumping; Electric Coal Cutting, Drilling, Ventilating, Winding, and Winding Systems Special Rules for the Installation and Use of Electricity; Definitions.

HEATHER, H. J. *Electrical Engineering for Mechanical and Mining Engineers.* 183 ill., 5¾ x 8¾, 344 pp. **\$4.50**

CONTENTS: The Electric Circuit. Continuous Currents. Resistance. Alternating Currents. Electrical Measurements. Continuous Current Dynamos. Continuous Current Motors and Parallel Running of Dynamos. Alternating Current Generators. Synchronous Motors and Parallel Running of Alternators. Transformers. Polyphase Systems and Transformations. Induction Motors. Effects of Running under Abnormal Conditions.

HUTCHINSON, R. W., Jr., and THOMAS, W. A. *Electricity in Mining.* Being a theoretical and practical treatise on the construction, operation, and maintenance of electrical mining machinery. Ill. *In Press.*

MAURICE, WILLIAM. *Electric Blasting Apparatus and Explosives.* With special reference to colliery practice. 88 ill., 5¾ x 8½, 167 pp. **\$3.50**

CONTENTS: Electric Fuses and Detonations Exploders; Wires and Cables; Testing; Explosives and Explosive Risks; Practical Applications; Laws and Regulations Relating to the Storage and Use of Explosives; Home Office Memorandum on the Permitted List Test.

PATCHELL, W. H. *Application of Electric Power to Mines and Heavy Industries.* 91 ill., 6½ x 9¼, 344 pp. **\$4.00**

CONTENTS: Electricity in Mines. Cables. Coal Cutters. Conveyors. Underground Lighting. Signalling. Hauling. Rating of Haulage. Haulage Calculations. Controller Resistances. Locomotives. Winding Engines. Types of Winders. Ventilation. Pumping. Ram Pumps and High Lift Centrifugals. Rolling Mills. Machine Tools. Welding of Metals. Electric and Induction Furnaces.

PATERSON, G. W. L. *Electric Mine Signalling Installations.* A practical treatise on the fitting-up and maintenance of electrical signalling apparatus in mines. 139 ill., 5¼ x 7¾, 203 pp. **\$1.50**

CONTENTS: Ringing Keys and Tappers; Electric Mining Bells; Signal Alarms and Relays; Electric Mining Indicators or Annunciators; Electric Generators for Mine Signal Installations; Primary Batteries for Signal Installations; Electric

Mining Shaft Signals; Electric Shaft Signal Wiring; Electric Engine Plane Signals; Electric Engine Plane Signal Wiring; Appendix.

Aims to illustrate and describe such apparatus which, as a result of experience, has been found to give the best results in practical mining work, and further to indicate, by the aid of plans and diagrams, the most approved methods of installing the apparatus and maintaining it in working order.

WALKER, S. F. *Electricity in Mining.* 168 ill., 51 plates, 6 x 8½. \$4.50

CONTENTS: Definitions; Units; Electric Mining Signals and Telephones, Electric Lighting for Mines; Generation of Electricity; Distribution of Power by Electricity; Application of Electricity to Driving Machines, etc., in Mines; Faults in Electrical Apparatus.

ELECTRICITY ON SHIPBOARD

HOBART, H. M. *Electric Propulsion of Ships.* 44 ill., 6 x 9, 167 pp.

Reprinting

CONTENTS: Introduction. Size and Power of Ships. Energy required per Ten Mile in Propelling Ships at Constant Speed. Frictional Resistance of Ships. Momentum of Ships. Speed and Efficiency of Propellers. Mechanical Speed-reduction Gearing for Steam Turbines. Electrical Speed-reduction Gearing for Steam Turbines. Use of Superheated Steam in Marine Engines. Electrical Gear as a Means of Improving the Load Factor. Internal Combustion Engines for Ship Propulsion. Some Systems of Propelling Ships Electrically. The Alter-phase System for Ship Propulsion. The Durnall System of Propelling Ships. The Emmet System of Ship Propulsion.

A study of the various elements that enter into this new subject. The author points out wherein the electric motor may prove the most efficient propelling medium for large ships. Attention is drawn to the difficulties that might be encountered by the space limitations on shipboard and means of overcoming them suggested.

JOHNSON, T. M. *Ship Wiring and Fitting.* 47 ill., 4¼ x 6½, 92 pp.

(Electrical Installation Manuals Series.)

Reprinting

CONTENTS: General Electric Lighting. Generating Sets. Dynamo Mains Switchboards. Circuits. Cables and Wiring. Fuseboards. Fittings and Incandescent Lamps. Plugs and Sockets. Switches. Lamps. Electric Bells. Telephones. Electric Fans. Special Apparatus.

VARIOUS APPLICATIONS OF ELECTRICITY

BROUGHTON, H. H. *Electric Cranes, Their Design, Construction and Application.*

New Edition in Press

CONTENTS: Introductory. Electric Equipment. Structural Steelwork. The Power Required to Drive Cranes. Mechanical Equipment. Crane Arrangements. Arrangement of Crane Mechanisms. Overhead Traveling Cranes and Gantry Cranes. Jib Cranes. Building Ship Equipments. Fitting-out Basin Cranes. Steelworks Cranes. Specifications. Properties of Sections, and Conductors.

GROTH, L. A. *Welding and Cutting Metals by Aid of Gases or Electricity.*

124 ill., 6 x 9, 280 pp. (Van Nostrand's Westminster Series.) \$2.50

CONTENTS: Gases and Sources for their Generation. Welding. Blowpipes. Welding of Sheet Iron. Welding Applied to Steam Boilers. Cutting Metals. Reports. Accidents. Legislation Relating to Calcium Carbide and Acetylene. Useful Tables.

Welding by the various methods now practiced is associated with and dependent upon many different factors, all of which must be considered simultaneously to enable even the most skillful workman to produce satisfactory results. This general description, therefore, of the various and distinct

methods, their suitability and selection for different operations, together with a collection of results and tests obtained, with the many illustrations given, should assist in the advance in technical knowledge and lead to the gradual accumulation of practical experience so necessary in every new industry.

LEMSTRÖM, S. *Electricity in Agriculture and Horticulture.* Ill., 6 x 9, 72 pp. **\$1.50**

It is well known that the question which is the subject of this book has been a favorite field of investigation for a century past. As the subject is connected with no less than three sciences—viz., physics, botany, and agricultural physics—it is in itself not particularly attractive. The causes which induced me to begin the investigation of this matter were manifold, and I venture to hope that an exposition of them will not be without general interest. (Extract from Author's Introductory Remarks.)

VOSMAER, A. *Ozone, Its Manufacture, Properties and Uses.* 75 ill., 6 x 9, 210 pp. **\$2.50**

CONTENTS: *Nature of Ozone.* Early History; Constitution; Nature; Occurrence; Properties; Tests. *Manufacture of Ozone.* Non-electrical Methods; Electrical Methods. *Electrolysis.* Electrical Discharges. In General: The Brush Discharge in Detail; Influence of Medium; Influence of Electrodes; Influence of Current; Influence of Circuit; Influence of Radiations, Magnetic, and Electric Fields; Influence of Dielectric; Theory; Ozonators; Non-dielectric System; Dielectric System; Efficiency. *Uses of Ozone.* Purification of Drinking Water; Purification of Air; Therapeutic Uses; Uses in the Industries; List of American Patents Bearing on Ozone; Bibliography.

Investigations and experiences with ozone covering a period of over fifteen years have led the author of this work to form opinions on the subject which often differ widely from those commonly accepted. In this work the results of these investigations and the conclusions formed by the author are clearly set forth. The aim has been to produce a book thoroughly scientific and accurate as distinguished from the mass of literature pertaining to ozone that is purely commercial and intended for advertising uses. This subject, which involves so many of the sciences, is still practically in its infancy, and its possibilities may yet prove limitless.

ENGINEERING LAW—VALUATION

BALL, W. V. *The Law Affecting Engineers.* Being a concise statement of the powers and duties of an engineer as between employer and contractor; as arbitrator and as expert witness. $5\frac{3}{4} \times 9$, 305 pp. **\$3.50**

CONTENTS: Status of an Engineer; Fees; Employment of an Engineer in a Salaried Post; Engineer as a Witness; Engineer and the Law of Negligence; Engineering Contracts; Old Materials on the Site; Tenders; Bills of Quantities; Specifications; Plans, Drawings and Designs; Extras and Alterations; Time; Certificates and Payment; Penalties and Bonuses; Maintenance and Defect Clauses; Subcontractors and Subcontracting; The Engineer's Assistant; Contracts Relating to the Supply of Electricity and Machinery; Arbitrations and Awards. Represents largely English practice, but the same laws would apply in substance in this country. Reference is frequently made to American decisions.

FOSTER, HORATIO A. *Engineering Valuation of Public Utilities and Factories.* 50 specimen forms. 6×9 , 361 pp. **\$3.00**

CONTENTS: Value: Commercial, Economics, Physical; Intangible; Worth Present, Original Cost; Reproduction Value, New; Overhead Charges; Organization Expense; Legal Expense; Engineering; Interest; Taxes and Insurance; Brokerage and Discount; Scrap or Salvage Value; Wearing or Service Value; Remaining Service Value; Development Expense; Franchise Value; Going Concern; Good Will; Reports of Valuation; Values of Public Utilities Property; Direction for the Valuation of Tangible Property; Permanence of Valuation; Instructions for Valuation; Forms for Use in Evaluating Property; Forms for Tabulating Final Result; Valuation of: Real Estate, Buildings, Railroads, Street Railways, Water and Undeveloped Power Privilege, Damages to a Water Power Hydro-Electric Plant; Water-Works Property, Telephone Property, Electric Light Property, Gas Property, Manufacturing Property, Valuation Forms; Cost of Valuing a Property; Value of Good Will, Going Concern and Going Value; Depreciation in Factories; Railways; Definitions of Term or Classes of Depreciation; Obsolescence; Inadequacy and Supercession; Wear and Tear; Deferred Maintenance, Elements of; Rules on Depreciation in Great Britain; Metcalfe's Classification of Depreciation; Methods of Calculating; Rates of Depreciation; Renewals; Rules Laid Down by Chicago; Amortization: Definition; Of Capital; Of Patents; Depreciation Funds: Handling of; Reserves; In Wisconsin; In Nebraska; Abstracts from Court Decisions; Appreciation; Franchise: Definition; Term Franchises; Indeterminate; Abstracts of Court Decisions; Tax; Capitalization: Discussion, Abstracts from Court Decisions, Control of Public Utilities Properties, Lists of Public Service Commissions; State; Municipal; Court Decisions: *Wilcox, et al. vs. Consolidated Gas Company. City of Knoxville vs. Knoxville Water Company; National Water Works vs. Kansas City; Kennebec Water District vs. City of Waterville; Montgomery County vs. Schuylkill Bridge Company; San Diego Land and Farm Company vs. Sanford et al.; Monongahela Navigation Company vs. United States; Cotting vs. Kansas City Stock Yards Company et al.; Smyth vs. Ames.* Covers all phases of the valuation of public service properties from the legal, economic and engineering points of view. The author's connection with many large interests has enabled him to obtain much of this valuable information at first hand, and to arrange a complete and authoritative treatise bearing on all the elements of valuation that should be useful to engineers, attorneys, accountants, public officials and managers of public service corporations.

HAYES, HAMMOND V. *Public Utilities, Their Fair Present Value and Return.* $5\frac{3}{4} \times 8\frac{1}{2}$, 220 pp. **\$2.00**

CONTENTS: *The Present Controversy. Ascertainment of Fair Present Value.* Basis for Fair Charges for Service for New Company; Basis for fair Charges for Service for a Previously Unregulated Company; Non-Competitive Successful

Undertakings; Non-Competitive Unsuccessful Undertakings; Fair Value of Property of Competitive Undertakings. *Fair Rate of Return. Replacement Cost. Cost of Promotion; Physical Property; Going Value. Actual Original Cost. Going Value. Depreciation.*

This book is intended to supplement the author's previous work, "Public Utilities, Their Cost and Depreciation" (see below), by entering into a discussion of the line of reasoning which must be followed by those whose duty it is to ascertain the fair present value of a property after an appraisal has been made and all the necessary information relative to it has been obtained. Likewise the subjects of going value and depreciation have been treated at some length with the hope of removing some of the existing misunderstandings concerning them. The present work advocates the use of a method of valuation somewhat different from those that have been pursued in the past in that the use of overhead charges has been reduced to a minimum. It is believed that this method of caring for the costs usually claimed as overhead charges will tend to greater accuracy and will eliminate much future controversy.

HAYES, HAMMOND V. Public Utilities, Their Cost New and Depreciation.
Second Edition. 5¾ x 8½, 275 pp. **\$2.00**

CONTENTS: Property Valuations—General Considerations. Replacement Costs of Physical Property. Determination of Replacement Cost. Value as Going Concern. Values of Good Will and Franchises. Original Cost. Commercial Value. The Worth of Service to the Consumer. Reserves for Depreciation. Life of Plant. Depreciation. Fair Present Value—Rates. Fair Present Value—Condemnation Sale. General Consideration Relative to the Regulation of Public Utility Undertakings.

The increasing supervision by state authorities in the United States of the operation of public service undertakings has necessitated valuations of the properties employed by many classes of utilities. Much of the work done in making these valuations was carried out under the direction of engineers of wide experience, who have formulated methods designed to furnish data upon which the true present value of the property under investigation could be determined with as near an approach to accuracy as is possible.

On the other hand a careful study of the details of the methods used by the various engineers and by the commissions, engaged upon this work, shows a considerable variation both in theories and principles that have been followed. It is of interest and of great importance that all such variations should be noted and the fundamental principles, involved in any complete valuation, be defined so clearly that two competent and experienced engineers presenting figures as to the value of the same property, independently, would obtain substantially the same results.

An attempt has been made to record in this work the principles, as far as they have been established, which must form the basis of a valuation of the property of a public utility undertaking. References have been given to decisions, which have been rendered in many important cases, bearing upon this subject.

HUMPHREYS, A. C. Lectures Notes on Some of the Business Features of Engineering Practice. With lectures and papers by other authors.
Second Edition, Revised and Enlarged. 6½ x 9¼, 585 pp. **\$2.50**

These notes were written and gathered by Dr. Humphreys, president of Stevens Institute of Technology, in order to put into printed form for textbook use with the senior class in engineering, and aims to point out what an engineer need know and understand of modern business methods and practice as applied to the business of engineering.

CIVIL ENGINEERING

FRYE, ALBERT I. *Civil Engineers' Pocketbook.* A reference book for engineers, contractors and students, containing rules, data, methods, formulas and tables. 1200 ill., 620 tables, $4\frac{3}{4} \times 7$, leather, 1658 pp. \$5.00

CONTENTS: Elementary Arithmetic. Powers, Roots, Reciprocals. Practical Arithmetic. Measures, Weights, Money. Algebra. Logarithms of Numbers. Plane Geometry. Solid Geometry. Plane Trigonometry. Spherical Trigonometry. Mensuration. Analytical Geometry. Descriptive Geometry. The Calculus. Mechanics. Theory of Stresses in Structures. Natural History of Materials. Explosives. Preservatives. Lumber, Lumbering. Metallurgy. Building Stones and Cements. Quarrying. Stone Cutting. Masonry. Stereotomy. Weights and Specific Gravity of Materials. Resistance of Materials. Properties and Tables of Plane Surfaces. Properties and Tables of Steel Shapes. Beams and Girders. Columns. Structural Details. Metal Gauges. Cordage, Wire and Cables. Pipes and Tubes. Bridges. Railroad Bridges. Electric Railway Bridges. Highway Bridges. Cantilever Bridges. Movable Bridges. Suspension Bridges. Arches. Trestles. Roofs. Buildings. Retaining Walls. Dams. Foundations. Wharves, Piers and Docks. Breakwaters. Jetties. Earthwork. Rock Excavation. Dredging. Tunneling. Surveying, Leveling. Railroads. Highways. Hydrostatics. Hydraulics. Water Supply. Water Works. Sanitation. Irrigation. Waterways. Water Power. Steam and Gas Power. Electric Power and Lighting.

A comprehensive treatment of Civil Engineering, in seventy sections, in which each main subject receives economic consideration and analysis, and is reinforced with excerpts from, and references to, the most important cost and other data in our leading technical publications—including hundreds of illustrations, all drawn and specially made for this book, of up-to-date engineering structures and details. "How to design engineering structures economically" has received careful study in the preparation of this work. The fundamental principles laid down can be followed readily by every young engineer, and carried to practical completion in the finished structure. Most of the tables are new and have been prepared regardless of time and expense. Many of them have been arranged in a novel manner, which will appeal especially to engineers; and all have been carefully checked and rechecked, to eliminate the possibility of errors. Graphical methods have been illustrated freely throughout the work, and in connection with analytical solutions. Methods and cost of work have received special attention. A voluminous and authentic glossary of engineering terms is added at the end of the book.

MAXWELL, W. H., and BROWN, J. T. (Editors.) *The Encyclopedia of Municipal and Sanitary Engineering.* A handy working guide in all matters connected with municipal and sanitary engineering and administration. Ill., 8×10 , 570 pp. \$10.00

It has become well-nigh impossible for those interested in local administration to keep themselves informed, even in general outline, on the many and varied subjects to which attention is now demanded by the State. The requisite information can only be gained by the expenditure of time, labor, and money in searching through a mass of literature mainly in the form of papers and reports. For the first time such information is presented concisely and in a form convenient for immediate reference. In order to facilitate this, the longer articles are divided into sections, the order of which, as well as their pith and scope, is shown by a brief index at the head of the article. A careful system of cross-referencing has been followed in order that the reader may rapidly acquire information in the cognate aspects of a subject.

The work has been prepared by many well-known experts, whose experience in the matters with which they deal is well known; but the information has been gathered from all parts of the world.

RANKINE, W. J. M. *Manual of Civil Engineering. Twenty-fourth Edition.* Revised by W. J. Millar, C.E. 300 ill., $5\frac{1}{2} \times 8$, 822 pp. \$7.50

CONTENTS: *Field Work.* Surveying with the Chain; Surveying by Angular

Measurements; Levelling; Setting-Out; Marine Surveying; Copying, Enlarging and Reducing Plans. *Materials and Structures*. Principles of Stability and Strength; Earthwork; Masonry; Carpentry; Metallic Structures; Underground and Submerged Structures. *Combined Structures*. Lines of Land-Carriage; Works of Inland Navigation; Tidal and Coast Works.

SURVEYING (Field and Table Books)

BOILEAU, J. T. **A New and Complete Set of Traverse Tables.** Showing the difference of latitude and departure of every minute of the quadrant and to five places of decimals. *Fourteenth Edition.* $6\frac{1}{2} \times 9\frac{3}{4}$, 96 pp. **\$5.00**

CONTENTS: Tables of: Difference of Latitude and Departure of Every Minute of the Quadrant to Five Decimal Places; Length of a Degree, Minute and Second of Latitude and Longitude for Every Degree of the Quadrant; Conversion Tables Showing: Yards and Feet into Chains, Links and Decimals of Links; Chains and Links into Yards and Decimals of Yards; Chains and Links into Feet and Decimals of Feet, and Other Useful Tables for Surveyors.

BURT, W. A. **A Key to the Solar Compass, and Surveyor's Companion.** Comprising all the rules necessary for use in the field. *Eighth Edition.* Ill., 4×7 , leather, 118 pp. **\$2.50**

A complete description of the author's invention, the solar compass, together with full rules for its use in the field by surveying parties, and contains also descriptions of the linear surveys, and the public land system of the United States, notes on the barometer, suggestions for an outfit for a four months' survey. A carefully compiled set of traverse tables and tables of natural sines and tangents, as well as a table of chords have also been added.

CAREY, ALFRED E., and OLIVER, F. W. **Tidal Lands.** A study of shore problems. Ill., $5\frac{1}{2} \times 8\frac{1}{2}$, 298 pp. **\$5.00**

CONTENTS: Tidal and Current Data; The Tidal Compartment of a River; The Foreshore; The Function of Vegetation; Sand Dunes; The Fixation and Plant Protection of Sand Dunes; Shingle Beaches and Their Fixation; Tidal Land Reclamation (Works); Erosion and Accretion (Works); Plant Winning of Tidal Lands—Salt Marshes; Miscellanea (Cliffs, Rivers, Channels); Blakeney Point, Norfolk, from an Engineering Point of View; The State and Local Control; Complementary Problems; Appendices; List of Dune Plants; Types of Shingle Beach (English); Plants of the Shingle Beach; Plants of the Salt Marsh; Salt Marsh Development; On the Distribution of *Suaeda Fruticosa* on the Blakeney Beach; List of Authorities in England and Wales Having Powers and Duties in Relation to Defense Against the Sea.

CLEVENGER, S. R. **A Treatise on the Method of Government Surveying** as prescribed by the U. S. Congress and Commissioner of the General Land Office, with complete mathematical, astronomical, and practical instructions for the use of the United States Surveyors in the field. 33 ill., $4\frac{1}{4} \times 6\frac{3}{4}$, 200 pp. **\$2.50**

CONTENTS: Introduction; Initial Point; Principal Base; Standard Parallel; Meridians; Township Lines; Division Meandering; Triangulations; Astronomy Used in Surveying; Convergency and Divergency; Compasses; Chaining; Flagging; Blazing; Corners; Bearings; Field Notes; Various Tables.

DORR, B. F. **The Surveyor's Guide and Table Book.** *Seventh Edition.* With a second appendix. 22 ill., $4\frac{1}{2} \times 6\frac{1}{2}$, 150 pp. **\$2.00**

In this book is given all of the information, especially from the legal standpoint that a surveyor should have at his immediate command for reference, including a traverse table and tables of the natural sines and tangents.

FAIRCHILD, JOHN F. Graphical Compass Conversion Chart and Tables.

Chart in two colors, 3 tables and descriptive matter. \$0.50

This graphical chart, with the tables accompanying it, is intended primarily to afford a ready method of comparison between the American (English) and French method of denoting circle and magnetic compass angles and also of comparison with the mills system used in military practice, accompanied by a clock face for assistance in visualizing angles.

GRUNSKY, C. E. Topographic Stadia Surveying. A manual with reduction tables and a new type of reduction diagram. 18 ill., $4\frac{1}{2} \times 7\frac{1}{2}$, flexible fabrikoid, 105 pp. \$2.00

CONTENTS: Introduction and Definitions; The Stadia Formula; Diagrams for the Reduction of Stadia Measurements; The Slide-rule as an Aid in Reducing Stadia Notes; Methods of Stadia Surveying; Practical Suggestions; The Platting of Stadia Notes; How to Use the Stadia Diagrams; Stadia Diagram in Pocket. The notes on stadia surveying, presented in this manual, were assembled for the benefit of the surveyor who has occasion to use the telemeter. The method of surveying described and the special type of diagram for the reduction of stadia notes have been found so satisfactory by the author, and by others who have tried them out, that he considers it a duty to give the profession the benefit of his experience, and believes that they will be generally accepted as a valuable addition to the literature of the subject.

GURDEN, R. L. Traverse Tables. Computed to four-place decimals for every single minute of angle up to 100 of distance. For the use of surveyors and engineers. *Fifth Edition*. Folio, $9\frac{1}{2} \times 14$, 270 pp. \$7.50

The distinctive features of this book, and the method of the employment of the Tables, may be briefly summarized as follows: I. The Tables are calculated to Single Minutes and to 100 of distance. II. The Traverses are given to four places of Decimals. III. The angles 0 to 45° are given at top of page, and 45° to 90° at the foot. IV. The whole numbers are given in the two center columns only.

McCULLOUGH, ERNEST. Practical Surveying. For surveyors' assistants, vocational and high schools. *Second Edition, Corrected*. 229 ill., 1 colored map, $5\frac{1}{4} \times 7\frac{1}{2}$, 410 pp. \$2.50

CONTENTS: Introductory; Chain Surveying; Levelling; Compass Surveying; Trigonometry; Transit Surveying; Surveying Law and Practice; Engineering Surveying; The Essentials of Algebra.

Written for students whose mathematical training stopped with arithmetic. It is intended primarily for home study and should be of service to surveyors who wish to "break in" assistants. No algebra or geometry required as a preliminary. The book is essentially a treatise on practical mathematics applied to land and engineering surveying. It is excellent for review purposes and for reference. Complete in every respect. Not an elementary treatise, although it does begin with the elements of the subject. The author has been a teacher in evening classes attended by young men in the employ of surveyors, contractors and engineers. He writes clearly and understands the difficulties encountered by students lacking the mathematical training required for an understanding of the modern college texts on surveying. He has been in active practice as an engineer since the year 1887, and the book is therefore very practical throughout, yet rigid in treatment.

MULFORD, A. C. Boundaries and Landmarks. Ill., $5\frac{3}{4} \times 8\frac{1}{4}$, 98 pp. \$1.00

CONTENTS: Work and Training of the Surveyor; Description of Property; Simple Deeds without Dimensions; Relative Legal Value of Evidences of Boundary. *Landmarks.* Stakes and Stones; Marked Timber; Ditches and Balks; Fences and Walls; Deeds with Complete Descriptions; Sources of Error in Descriptions; Relations of the Surveyor and the Lawyer; House Lots; Highway Records; Re-Running Old

Highway Records; Laying Out New Roads; Responsibilities of the Surveyor. Explains and endeavors to familiarize the surveyor with the types of old boundaries and landmarks commonly found in Eastern United States. This work shows how to meet the conditions that might arise in country surveying, such as the relocation of old boundaries, the significance attached to natural landmarks, their position, and what relation they bear to the land surveyed. The meaning meant to be conveyed by certain kinds of old landmarks is carefully explained and the question of old deeds and how they are to be construed is taken up. Methods of actual measurement and surveying instruments are not discussed in this book, which devotes itself entirely to the question of locating boundaries.

ORMSBY, M. T. M. *Elementary Principles of Surveying.* A textbook for the use of students, engineers, etc. 138 ill., 4 folding plates. $4\frac{3}{4} \times 7\frac{1}{2}$, 241 pp. **\$2.00**

CONTENTS: Chain Surveying; Traverse Surveying; Levelling and Contouring; Triangulation Surveys; Tacheometric Surveying; Curve Ranging; Answers to Exercises.

STILES, A. *Tables for Field Engineers.* Designed for use in the field. Ill., $4\frac{1}{4} \times 6\frac{3}{4}$, 156 pp. **\$1.00**

CONTENTS: Explanation of Tables; Table of Radii and Their Logarithms, Tangential Offsets and Middle Ordinates; Table of Chords, Versed Sines, External Secants and Tangents to a One Degree Curve; Table of Natural Sines and Tangents to Every Degree and Minute of the Quadrant.

TRAVERSE TABLE. *Third Edition.* $3\frac{3}{4} \times 6$, boards, 196 pp. (Van Nostrand Science Series, No. 115.) **\$0.75**

CONTENTS: Traverse Table Showing the Difference of Latitude and Departure for Distances Between 1 and 100 and for Angles to Quarter Degrees Between 1° and 90° ; Table of Natural Sines and Tangents for Each Five Minutes of the Quadrant.

VAN NOSTRAND'S Table Book for Civil and Mechanical Engineers. Compiled by Geo. W. Plympton. $3\frac{3}{4} \times 6$, boards, 195 pp. (Van Nostrand Science Series, No. 104.) **\$0.75**
full leather, **\$1.00**

A series of useful tables that the engineer might be called upon to consult in his daily practice, such as conversion tables, squares, cubes and roots, natural sines and tangents, areas of circles, weights of metals in various forms, strength columns, velocity of rivers and force of the wind, copper wire tables, soldering, brazing, rainfall tables, etc.

WHARTON, W. J. L. *Hydrographical Surveying.* A description of the means and methods employed in constructing marine charts. *Third Edition*, revised and brought up-to-date by Admiral Sir Mostyn Field. Ill., 6×9 , cloth. *In Press*

WILLIAMSON, JAMES. *Surveying and Field Work.* A practical textbook. 271 ill., 2 plates, $5\frac{3}{4} \times 8\frac{3}{4}$, 360 pp. **\$3.00**

CONTENTS: Surveying; Fundamental Principles. *Chain Surveying.* Instruments, Field Operations, Running a Survey Line, Arrangement of Survey Lines, Errors, Special Problems; Plotting the Plan; Compass and Sextant Surveying; The Theodolite; Transverse Surveying with the Theodolite; Plotting Traverse Survey, by Angle and Distance, by Co-ordinate or Latitude and Departure Method; Triangulation; Problems; Levelling; Errors in Levelling; Sections, Contours, etc.; Setting Out Curves; Calculation of Areas; Calculation of Earth Work Quantities; Adjustment of Instruments; Geometric and Trigonometric Formulæ.

WILLIAMSON, R. S. Practical Tables in Meteorology and Hypsometry. Being an appendix to the paper on the Use of the Barometer on Surveys and Reconnaissances. Submitted to the Chief of Engineers, U. S. A. $9\frac{1}{4} \times 12$, 155 pp. **\$2.50**

CONTENTS: Table A, Giving the Correction to be Applied to English Barometers; Table B, For Reducing Observations to Level; Table C, Psychrometrical Tables; Table D, For Computing Differences of Altitude from Observations with the Barometer.

WRIGHT, T. W., and HAYFORD, J. F. Adjustment of Observations. By the method of least squares, with applications to geodetic work. *Second Edition, Rewritten.* Ill., cloth, 6×9 , 307 pp. **\$3.00**

CONTENTS: Law of Error; Adjustment of Direct Observations of One Unknown; Indirect Observations; Condition Observations; Application to Adjustment of Triangulation; Method of Angles; Of Deductions; Application to Base Line Measurement and to Leveling; Application to Selection of Methods of Observation.

RAILWAY ENGINEERING

BALL, J. D. W. Reinforced Concrete Railway Structures. 124 ill., $6 \times 8\frac{3}{4}$, 228 pp. **\$2.50**

CONTENTS: Preliminary Considerations; Bending Stresses; Shear Stress; Floors and Buildings; Foundations and Rafts; Retaining Walls; Bridges; Arches Bridges; Sleepers, Fence Posts, etc.; Summary of Notation Employed. Aims to describe the generally accepted principles and processes upon which the design and construction of reinforced concrete structures depend, and more especially those structures that come within the railway engineer's practice. Complicated formulas and calculations have, as far as possible, been avoided and the attention concentrated upon arriving at results as simply as possible and presenting them conveniently.

CARY, E. R. Solution of Railroad Problems by the Slide Rule. 43 ill., 4×6 , 146 pp. **\$1.00**

(Author is professor of Railroad Engineering and Geodesy in Rensselaer Polytechnic Institute, Troy, N. Y.)

CONTENTS: The Slide Rule. Simple Curves. Compound Curves. Vertical Curves. Turnouts. The Easement Curve. Earthwork. Problems. Diagrams Tables.

The ease and rapidity of solving problems in railroad curves by the use of the slide rule led the author to develop this set of problems. The object of this book is to present similar problems for the convenience of students who have studied Railroad Curves and the Theory of the Slide Rule. A discussion of the slide rule, the development of the equations used and a discussion of the easement curve have been added to make the book of more general interest.

DERR, W. L. Block Signal Operation. A practical manual. Pocket size. *Second Edition.* Ill., $7 \times 4\frac{3}{4}$, oblong, 270 pp. **\$1.50**

CONTENTS: Introductory; General Principles; Block Signals; Signal Lamps; Block Tower; Signal Bells; Block Record; Train Orders at Block Stations; Blocking at Junctions and Crossings; Manual Blocking; Controlled Manual Blocking; Automatic Blocking; Machine Blocking.

DILWORTH, EDWARD C. Steel Railway Bridges, Designs and Weights. 55 ill., 105 full-page plates, $12\frac{1}{2} \times 9\frac{1}{2}$, 191 pp. **\$6.00**

(Author is designing and contracting engineer with the Pittsburgh-Des Moines Steel Co., and was formerly designing engineer with the American Bridge Co.)

CONTENTS: Designing; Centrifugal Force; Draw Spans; Turntables; Detail-

ing; Camber-Plate Girders; Notes on Weight Curves; Specifications for Ry. Bridges Am. Ry. Eng. Asso.; Facilitating Design; Deck Plate Girders—Weight Curves; Single-Track Through Plate Girders—Weight Curves; Double Track Through Plate Girders—Weight Curves; Alternate and Misc. Details for Plate Girder Spans; Single-Track Deck Riveted Spans—Timber Floor—Weight Curves; Single-Track Poney Riveted Spans—Weight Curves; Double-Track Poney Riveted Spans—Weight Curves; Single-Track Through Riveted Spans—Weight Curves; Double-Track Through Riveted Spans—Weight Curves; Typical Detail of Rocker Nest; Double-Track Deck Riveted Spans—Weight Curves; Alternate and Misc. Details for Deck Spans; Single-Track Through Pin Spans—Weight Curves; Alternate and Miscellaneous Details for Pin and Riveted Spans; Double-Track Through Pin Spans—Weight Curves; Single Track Through Plate Girder Draw Spans—Weight Curves; Single-Track Through Riveted Draw Spans—Weight Curves; Counter-Balanced Draw Spans—286' Long; Double Track Through Riveted Draw Spans—Weight Curves; Single-Track Viaducts—Weight Curves; Alternate and Miscellaneous Details for Viaducts; Double-Track Viaducts—Weight Curves; Turntables—Deck 85' Long; Turntables—Through—85' Long; Wheel Load Diagram for E50; Moments, Shears, and Reactions E50; Moments and Shears for Truss Bridges; Draw Span Formulæ and Coefficients; Allowable Web Shears; Compressive Stresses; Centers of Gravity for Plate Girder Flanges; Maximum Length for Plates; Approximate Radii of Gyration; Maximum Lengths of Shapes; Memorandum for Estimating.

GARCIA, A. J. R. V. *Dictionary of Railway Terms in Spanish-English and English-Spanish.* 6 x 9, 350 pp. **\$3.00**

A Spanish-English and English-Spanish dictionary containing not only the principal terms, but all the rare words as well as those of recent origin that concern railway enterprise, the details of the laying of the line, the rolling stock from its trucks and wagons to its luxurious dining cars, and the stations with their hotels, garages and dependencies. Special terms that in Cuba, Mexico, and South America differ from those used in Spain are also included.

JORDAN, LEONARD C. *The Practical Railway Spiral.* With short working formulas and full tables of deflection angles and complete notes of illustrative examples. 7 diagrams, 4 x 6½, leather, 164 pp. **\$1.50**

(Author is principal of the civil engineering department in the Heffley Institute, Brooklyn.)

CONTENTS: Introduction. Superelevation. The Curve Easement. Spiral Development. Revision. **TABLES:** Maximum Velocity on Curves. Minimum Length of Spirals. Deflection Angles of General Spiral. Functions and Deflections of all Spirals. Radii and Logarithms. Corrections, Tangents and Externals. Tangents and Externals to a One Degree Curve.

Attempts to clear up and modify the theory and to eliminate the existing inconsistencies of spiral curves. The Author who has had considerable experience on railroad maintenance, in actual track work itself and on location both in mountainous country and on the plains, believes that "the Practical Railway Spiral" is the closest possible approach to the perfect curve easement in accord with the requirements of many of the best American railways.

SELLEW, WILLIAM H. *Steel Rails, Their History, Properties, Strength and Manufacture.* With notes on the principles of rolling stock and track design. 361 ill., 35 folding plates, 7¾ x 10¾, 575 pp. **\$10.00**

(Author is principal assistant engineer, Michigan Central Railroad.)

CONTENTS: DEVELOPMENT OF THE PRESENT SECTION. Early Sections. Present Sections. PRESSURE OF THE WHEEL ON THE RAIL. Speeds of Modern Locomotives. Weights of Modern Locomotives. Effect of Excess Balance and Angularity of the Main Rod. Effect of Irregularities in the Track. Effect of Rocking of the Engine. Effect of Flat Spots in the Wheels. Impact Tests. The Dynamic Augment of the Wheel Load. Electric Locomotives. Cars. SUPPORTS OF THE RAIL. The Tie. Bearing of the Rail on the Tie. Fastening of the Rail to the Tie. Strength of the Tie. Bearing on the Ballast. Bearing on the Sub-grade. Supporting Power of the Tie.

STRESSES IN THE RAIL. Stresses at Point of Contact of the Wheel with the Rail. Proposed Solutions of the Bending Stress in the Rail. Tests to Determine the Bending Stress in the Rail. Calculation of the Bending and Shearing Stress in the Rail. Effect of the Joint. **STRENGTH OF THE RAIL.** Influence of Stress and Strain on the Strength of the Rail. Effect of Low Temperature on the Strength of the Rail. Physical Tests of the Strength of the Rail. The Strength of the Rail and Proper Weights for Various Conditions of Loading. **INFLUENCE OF DETAIL OF MANUFACTURE.** Chemical Composition. Extraction of the Iron from Its Ore. Conversion of the Steel. Casting the Ingot. Influence of Mechanical Work. **RAIL SPECIFICATIONS.** Comparison of American Specifications. Specifications of the New York Central Lines. Specifications for Rails Rolled for Export. British Standard Specifications of Bull-Headed Railway Rails. British Standard Specifications of Flat Bottom Railway Rails. Specifications for Street Railway Rails. Bibliography of Rail Specifications. Appendix, Reports and Records.

SELLEW, W. H. *Railway Maintenance Engineering.* With notes on construction. 194 ill., 6 folding plates, $5\frac{1}{4} \times 7\frac{1}{2}$, 380 pp. (Van Nostrand's Textbooks.) **\$3.00**

CONTENTS: *Engineering.* Reconnaissance and Exploration Surveys; Location; Construction; Estimation of Quantities; Curves and Spirals. *Land.* Basic Divisions of Land; Purchase of Land. *Grading.* Sections; Drainage; Construction of the Road-Bed; Construction Contract; Bearing Power of the Sub-Grade. *Bridges, Trestles and Culverts.* *Ties.* Forms of: Metal Ties, Concrete Ties; Conservation of the Timber; Supply; Strength of Ties. *Rails.* Specifications; Length; Rail Failures. *Other Track Material.* Derails; Crossings; Joints; Bolts; Nut Locks; Spikes; Tie Plates; Anti-Creepers; Bumping Posts. *Ballast.* Sub-Ballast; Sections; Specifications; Physical Tests; Cleaning; Handling and Distribution; Distribution of Pressure. *Maintaining Track and Right of Way.* Track Laying; Surfacing; Right of Way Fences; Snow and Sand Fences, and Snow Sheds; Crossings; Signs; Roadway Small Tools; Section Work; Fires on Right of Way. *Station and Roadway Buildings.* Local Stations; Terminal Passenger and Freight Stations; Track Scales. *Water Stations.* Pumping; Tanks; Stand-Pipes; Track Tanks; Water-Treating Plants. *Fuel Stations.* Platforms; Docks; Clam Shells; Mechanical Plants; Storage of Coal. *Shops and Engine Houses.* Round House, Heating Plants; Turn Table; Cinder Pits; Sand Houses; Shops. *Icing Stations.* Harvesting Natural Ice; Manufacture of Ice; Insulation; Building for Storing Ice; Delivering Ice to Cars. *Signals and Interlockers.* Essentials of Signalling; Train Order and Manual Block Signals; Mechanical Interlocking.

This book is intended primarily for classroom use, but contains considerable matter of a character sufficiently advanced to claim the attention of engineers in the maintenance of way departments of railways.

SHUNK, W. F. *The Field Engineer.* A handy book of practice in the survey, location, and trackwork of railroads, containing a large collection of rules and tables, original and selected, applicable to both the standard and narrow gauge, and prepared with special reference to the wants of the young engineer. *Twenty-first Edition, Revised and Enlarged.* Ill., $4\frac{1}{4} \times 6\frac{3}{4}$, flexible fabrikoid, 355 pp. **\$2.50**

CONTENTS: Logarithms; Plane Trigonometry; Adjustment and Use of Instruments; Propositions and Problems Relating to the Circle Tracing Curves and Turning Obstacles in the Field; Suggestions as to Field Work and Location Projects; Problems in Field Locations; Track Problems; Tables.

WAGNER, H. E., and EDWARDS, H. W. *Railway Engineering Estimates.*

In Press

CEMENT AND CONCRETE**ANDREWS, E. S. Elementary Principles of Reinforced Concrete Construction.**

A textbook for the use of students, engineers, architects, and builders.
Second Edition, Revised and Enlarged. 57 ill., 5 x 7½, 255 pp. **\$2.00**

CONTENTS: Notation; Properties of Concrete and Steel; Loads; Working Stresses; Bending Moments, and other Useful Data; Reinforced Concrete in Direct Compression; Reinforced Concrete Beams; Reinforced Concrete Beams Subjected to Bending with Axial Thrust; Graphical Treatment of Reinforced Concrete Beams; General Treatment of Shear Stresses and Deflections for Reinforced Concrete Beams; Reinforced Concrete Columns; Some Leading Systems of Reinforcements.

BALL, J. D. W. Reinforced Concrete Railway Structures. 124 ill., 6 x 8¾, 228 pp. **\$2.50**

CONTENTS: Preliminary Considerations; Bending Stresses; Shear Stress; Floors and Buildings; Foundations and Rafts; Retaining Walls; Bridges; Arches Bridges; Sleepers, Fence Posts, etc.; Summary of Notation Employed.

BROWN, WM. A. The Portland Cement Industry. A practical treatise on the building, equipping and economical running of a Portland cement plant. With notes on physical testing. Ill., 5¾ x 8¾, 168 pp. **\$3.00**

CONTENTS: Introductory; Historical; Development of the Industry; Manufacture; Raw Materials; Design and Construction of a Modern Portland Cement Plant; The Rotary Kiln; Power Plants; Miscellaneous; Costs and Statistics; Equipment; Development of Cement Testing; Chemical Composition; Fineness; Tensile Strength; Time of Setting; Soundness or Constancy of Volume. A concise, well arranged and abundantly illustrated manual treating the cement industry from all angles.

CASLER, MELVIN D. Simplified Reinforced Concrete Mathematics. Derivation of simple, universal formulas and their application to beams, columns and arches, with nomographic computing device. Ill., 5 x 7½, 66 pp. **\$1.00**

The main purpose of this book is to provide the engineer with practical working formulas for the design and investigation of reinforced concrete members, and with means for applying these formulas with a minimum of computation. The proposed formulas are derived for general application to beams subject to direct longitudinal stress in conjunction with transverse moment, to eccentrically loaded columns, and to arches. One of its objects is to simplify the formulas and their application to beams, columns and arches, without loss in mathematical accuracy, so as to make the use of special curves and tables for various assumptions to properties, stresses, dimensions, etc., etc. The author has also included some labor-saving devices for use in proportioning members and has demonstrated, by definite examples, the application of the formulas to beams, columns and arches. For work of varied nature, the methods given in the book effect a large saving in time over prevalent methods of computation. The contents are: Derivation of Formulas; Labor-Saving Devices; Illustrative Examples; General Notes on Reinforced Concrete Design.

COCHRAN, JEROME. A Treatise on Cement Specifications. Illus., 5¾ x 8¾, 113 pp. **\$1.00**

CONTENTS: Introduction. General Conditions Covering the Use of Cement. Furnishing Cement to the Contractor. Purchase of Cement from Manufacturer. Delivery and Storage of Cement. Inspection and Tests of Cement. Test Requirements for Cement. Methods of Testing Cement. Significance of Tests of Cement.

Methods of Chemical Analysis of Portland Cement. Bibliography of Specification for Cement. Bibliography of Foreign Cement Specifications.

Brings together into a logical sequence all the points that need be taken into

COCHRAN, JEROME. General Specifications for Concrete and Reinforced Concrete, including Finishing and Waterproofing. Ill., $6\frac{1}{4} \times 9\frac{1}{4}$, 300 pp. **\$2.50**

CONTENTS: Introduction. Concrete Materials. Proportioning and Mixing Concrete Forms and Centering (False-work) Steel Reinforcement. Transporting and Placing of Concrete. Finishing Concrete Surfaces. Waterproofing Concrete Work. Design of Reinforced Concrete. Reinforced Concrete Building Construction. Appendix. Suggested Forms and Formulas for Reinforced Concrete Construction.

HAWKESWORTH, J. Graphical Handbook for Reinforced Concrete Design.

A series of plates, showing graphically, by means of plotted curves, the required design for slabs, beams, and columns under various conditions of external loading, together with practical examples showing the method of using each plate. Ill., $9 \times 11\frac{1}{4}$, 64 pp. **\$2.00**

CONTENTS: Values of Constant for Determining Resisting Moments; Design of Slabs; Spacing of Square Bars; External Bending Moment in Footing Slabs; Value of Resisting Moment; Conversion of Areas of Metal Cross Section; Location of Neutral Axis; Allowable Stresses and Loads; Design of Hooped Columns; Complete Design of a Reinforced Concrete Structure.

MARSH, C. F., and DUNN, WM. Manual of Reinforced Concrete. *Third Edition, Rewritten and Considerably Enlarged* by the addition of much useful information and many new tables and diagrams. Ill., numerous folding plates, $4\frac{1}{4} \times 6\frac{1}{2}$, 491 pp. **\$2.00**

CONTENTS: Materials; Construction; Waterproofing; Loads, Bending Moments and Shearing Forces; Calculations; General Information, Tables, Diagrams.

MARSH, CHARLES F. Reinforced Concrete Compression Member Diagram. $40 \times 30\frac{1}{2}$, in a cloth folder, $9\frac{1}{2} \times 7\frac{1}{4}$. **\$1.50**

The description accompanying the diagram is very explicit and gives general instructions for using the diagrams which have been prepared in accordance with the second report of the joint committee appointed by the Royal Institute of British Architects and the London County Council Draft Regulations, consisting of four graphs on one sheet, all continuously related to each other. The manner of use for designing a pillar is, roughly, as follows: Taking the load as starting point trace to an intersection with a line for the size of pillar selected, red lines showing circular cores, and blue, square cores. From this first intersection trace on to intersect with another line, representing the proportion of vertical steel, and then on to meet a line representing, either by its red, green or blue color, the kind of concrete chosen and the value of a constant chosen from a table and dependent upon the kind of binding and its spacing. Thus a ratio of volumes of concrete and hooping is derived, and by the aid of another diagram, a factor is ascertained which gives the size of the binding, having regard to the previously chosen spacing. A pillar already designed may be checked by working back the opposite way.

MARTIN, NATHANIEL. The Properties and Design of Reinforced Concrete.

Instructions, authorized methods of calculation, experimental results, and reports by the French Government Commissions on Reinforced Concrete. 29 diagrams, $6\frac{3}{4} \times 9\frac{1}{4}$, 133 pp. **\$1.50**

(Author is lecturer on reinforced concrete in the Glasgow Royal Technical College.)

CONTENTS: Instructions Relative to the Use of Reinforced Concrete. A Circular Issued by the French Ministry of Public Works in Explanation of the Instructions. Report of the Draft Regulations by the Commission Nominated by the General Council of Bridges and Roads. The Experimental Work of the Commission. The

Report and Draft Regulations Presented by the Commission, being a Review of the Principal Results of the Experimental Work of the Commission. Some Conclusions of the Commission from the Study of the Elementary Properties of the Materials Constituting Reinforced Concrete. Notes Presented by M. Considère. Appendix.

RICHARDS, W. A., and NORTH, H. B. A Manual of Cement Testing.

For the use of engineers and chemists in colleges and in the field. 56 ill., $5\frac{3}{4} \times 8$, 147 pp. **\$1.50**

CONTENTS: Classification, Composition, Manufacture. Sampling. Fineness Specific Gravity. Normal Consistency. Constancy of Volume. Tensile Strength Compressive Strength and Transverse Tests. Sand and Stone. Laboratory Equipment. Part Played by Chemical Analysis. Preparation of Sample for Analysis. Analysis of Cement, Limestone, Marl, Slag and Clay. Standard Specifications for Portland Cement.

This laboratory manual is intended to assist in bringing about uniformity in the testing of cement. The authors have endeavored to present, in a somewhat condensed form, such directions as will enable a student in the laboratory or an operator in the field office to interpret correctly the Standard Methods of Testing and Specifications for Cement, as published by a committee of the American Society of Civil Engineers, American Society for Testing Materials, Association of American Portland Cement Manufacturers and the American Railway Engineers and Maintenance of Way Association. Sufficient detail is given to enable all students to learn the same manipulations and thus be able to perform each test in a certain well-defined and similar manner. Mr. Richards is a practical engineer and has been engaged in practical engineering work and teaching of engineering subjects for a number of years, and Dr. North has made a special study of cement and for two years was a student of Prof. Henri Le Chatelier, the great French authority on cement.

RINGS, FREDERICK. Reinforced Concrete Bridges. 373 illustrations. $8\frac{1}{2} \times 12$, 196 pp. **\$5.00**

CONTENTS: Disadvantages and Advantages. Architectural Treatment. Water and Weather Proofing. The Materials Used. Regulations of the London County Council. Practical Suggestions and Superintendence. Bending Moments, Stresses, and Strains. Loads on Bridges and External Stresses. Calverts, Coverings, Tunnels, etc., Design of Girder Bridges. Calculation of Girder Bridges and Worked Problems. Examples of Girder Bridges. Design of Arched Bridges and Abutments. Theory of the Arch. Examples of Arched Bridges. Formula, Notes, Schedules, and Other Useful Information.

A record of the most important features and facts for the bridge designer. The series of bridges illustrated, while possibly not the most remarkable structures extant, are, however, illustrative of the various types occurring in the usual practice of the civil engineer.

RINGS, FREDERICK. Reinforced Concrete in Theory and Practice. *Second Edition, Revised and Enlarged.* Ill., $5\frac{1}{4} \times 8$, 260 pp. **\$4.50**

CONTENTS: Introductory; Materials; Execution of Work; Applications of Reinforced Concrete; Loads, Moments, Stresses, Resistance; Formulae for Slabs with Single Reinforcements; Shearing Stresses and Adhesion; Formulae for Columns; Arch and Bridge Construction; Retaining Walls, Circular Structures, etc.; Worked Examples; London County Council Regulations; Memoranda and Tables; Symbols.

Does not advocate or give prominence to any particular method of construction, but gives in a concise form the best of many formulæ and systems used in various countries, and deals with the subject in such a manner as to be intelligible to average students of architecture who have not been required to devote that amount of study to the theory of construction which is demanded of the engineer, to whom, however, it should also be useful.

SEARLE, A. B. Cement, Concrete and Bricks. 113 ill., $5\frac{1}{2} \times 8\frac{1}{4}$, 415 pp. **\$3.00**

CONTENTS: The Raw Materials for Cements; Methods of Cement Manufac-

ture; Chemical and Physical Changes in Cements; Changes That Occur in Setting and Hardening; Testing the Properties of Cements; The Components of Concrete and Their Properties; Preparation of Concrete; Reinforced Concrete; Special Properties of Concrete; Testing Concrete; Raw Materials for Bricks; Methods of Brickmaking; The Chemical and Other Changes in Drying and Burning Bricks; Basic and Neutral Bricks.

SCOTT, A. ALBAN H. Reinforced Concrete in Practice. 130 ill., $4\frac{3}{4} \times 7\frac{1}{2}$, 188 pp. \$2.00

CONTENTS: Materials; Testing of Materials; Centering; Preparation of Steel Work; Concrete; Striking of Centering; Cutting Away and Making Good; Surface Treatment and Finish; Work Requiring Special Method; Fixing of Machinery, Plant, etc.; Testing of Finished Structures; Contraction, Expansion.

WARREN, F. D. Handbook on Reinforced Concrete for Architects, Engineers and Contractors. Ill., $4\frac{1}{2} \times 7\frac{1}{4}$, 271 pp. \$2.50

CONTENTS: Tensile Strength of Cement; Tensile Strength of Concrete Steel or the Effect of Steel Members upon Concrete When Embedded in the Latter and the Whole is Undergoing Tension Caused by Bending; Designs of Concrete Structures; Design of Reinforced Concrete Trusses.

WHEATLEY, O. Ornamental Cement Work. 81 ill., $5\frac{1}{2} \times 8\frac{3}{4}$, 132 pp. \$2.25

CONTENTS: Cement Work on Art Craft; The Uses for Which it is Suitable; Materials and Workshop; Mould-Making and Templets; Technique; Choice of Ornaments; Extended Uses.

EXCAVATION AND TUNNELING

BOYCOTT, G. W. M. Compressed Air Work and Diving. A handbook for engineers, comprising deep-water diving and the use of compressed air for sinking caissons and cylinders and for driving subaqueous tunnels. Ill., $6\frac{1}{2} \times 9\frac{3}{4}$, 128 pp. \$4.25

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COPPERTHWAIT, WM. C. Tunnel Shields, and the Use of Compressed Air in Subaqueous Works. • 257 ill., $9 \times 11\frac{1}{4}$, 434 pp. \$9.00

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PRELINI, CHARLES. Tunneling. An exhaustive treatise. *Sixth Edition, Entirely Revised and Enlarged.* 160 ill., 6×9 , 350 pp. \$3.00

(Author is professor of civil engineering at Manhattan College.)

CONTENTS: The Historical Development of Tunnel Building. Preliminary Considerations. Choice between a Tunnel and an Open Cut. Method and Purpose of Geological Surveys. Methods of Determining the Center Line and Forms and Dimensions of Cross-Sections. Excavation Machines and Rock Drills: Explosives and Blasting. General Methods of Excavating Shafts; Classification of Tunnels. Methods of Timbering or Strutting Tunnels. Methods of Hauling in Tunnels. Types of Centers and Molds Employed in Constructing Tunnel Linings of Masonry. Methods of Lining Tunnels. Tunnels through Hard Rock; General Discussion; Representative Mechanical Installations for Tunnel Work. Excavation by Drift. Simplon and Murray Hill Tunnels. Excava-

tion by Headings. European and American Methods. St. Gothard and Fort George Tunnels. Comparison of Methods. Excavating Tunnels through Soft Ground. General Discussion. The Belgian Method. The German Method. Baltimore Belt Line Tunnel. The Full Section Method. The English, American and Austrian Methods. Special Treacherous Ground Method. Italian Method; Quicksand Tunneling: Pilot Method. Open-Cut Tunneling Methods; Tunnels under City Streets. Boston Subway, and New York Rapid Transit. Submarine Tunneling—General Discussion—The Severn Tunnel. The Compressed Air Method—The Milwaukee Water Works. The Shield System. The Shield and Compressed Air Method. The Pennsylvania Railroad Tunnel under the Hudson River. Tunnels at Very Shallow Depths.—The Cofferdam Method.—The Van Buren Street Tunnel, Chicago—The Pneumatic Caisson Method. The Tunnels under the Harlem, Seine and Detroit Rivers. Accidents and Repairs in Tunneling During and After Construction. Relieving Timber-Lined Tunnels with Masonry. Ventilating and Lighting of Tunnels During Construction. Cost of Tunnel Excavation, and the Time Required for the Work.

PRELINI, C. Dredges and Dredging. 82 ill., $6\frac{1}{4} \times 9\frac{1}{2}$, 280 pp. **\$3.00**

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PRELINI, C. Graphical Determination of Earth Slopes, Retaining Walls and Dams. 75 ill., $6 \times 8\frac{1}{2}$, 136 pp. **\$2.00**

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GILLMORE, Q. A. *Practical Treatise on the Construction of Roads, Streets and Pavements.* Tenth Edition. 70 ill., 5¼ x 7½, 258 pp. \$1.25

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CONTENTS: Location, Grades, Widths and Cross-Sections of Rural Roads Regulations of the California Highway Commission Regarding Surveys and Plans; Drainage, Culverts and Bridges; Earth and Sand-Clay Roads; Gravel Roads; Water-Bound Macadam Roads; Road-Building Rocks; Concrete Roads; Standard Specifications for Portland Cement; Petroleum and Residuums; Asphalt and Native Solid Bitumens; Asphalt Materials for Roads; Tar and Tar Products; Bituminous Surface Applications; Brick Roads; Brick Pavement on a One-Inch Concrete Base; Highway Bonds; Resistance of Roads to Traction; Rural Public Roads in the United States; Money Spent on Roads in the United States; Extent of Surfaced Roads in the United States; Motor Car Statistics; Vitrified Paving Brick Production; Broken Stone Production; Gravel and Paving Sand Production; The Reasons for Improving Roads.

This book appeared originally as Part II of the 1917 Good Roads Year Book, which was an outline of road building compiled from material contributed by over fifty leading American highway engineers.

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ANDREWS, EWART S. *The Theory and Design of Structures.* A text-book for the use of students, draughtsmen, and engineers engaged in constructional work. *Third Edition, Revised and Enlarged.* 272 ill., 2 plates, 5¾ x 8¾, 601 pp. **\$3.50**

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CONTENTS: Composition and Resolution of Forces Mathematically Considered; Framed Structures; Superposed and Space Frames; Moments; Roofs; Shearing Force and Bending Moment Diagrams; Relation Between the Curves of Load, Shear, and Bending Moment; Shearing Force and Bending Moment for a Moving Load; Moments of Areas; Stress Distribution on Cross-Sections; The Line of Pressure.

STEINMAN, D. B. *Suspension Bridges and Cantilevers.* Their economic proportions and limiting spans. *Second Edition, Revised.* 4 folding plates, 3¾ x 6, 185 pp. (Van Nostrand's Science Series, No. 127.) **\$0.75**

CONTENTS: Design of Suspension Bridges, Wire Cable *vs.* Eye-bars, Economic Rise-ratio, Depth of Stiffening Truss, Design of Cantilevers, Economic Span-ratios, Minimum Width, Empiric Formulæ for Weights and Costs, Maximum and Economic Spans, Span of Equal Cost, Comparison and Conclusions.

An investigation of the relative adaptability of the cantilever and suspension types to long-span construction, together with a determination of the economic proportions and outlines of the methods of design.

THAYER, HORACE R. *Structural Design.* Ill., 6 x 9. To be complete in three volumes. Each volume complete and sold separately.

(Author is assistant professor of structural design at Carnegie Institute of Technology.)

Volume I., *Elements of Structural Design. Second Edition, Revised.* 228 pp. **\$2.50**

CONTENTS: MATERIALS. Introduction; Growth and Characteristics of Timber;

Faults of Timber; Preservative Processes for Timber; Varieties of Timber; Strength of Timber; Uses of Timber; Cast Iron; Wrought Iron; Bessemer Steel; Open Hearth Steel; Cast Steel and Alloys of Steel; Paints. COMMERCIAL SHAPES. Handbooks, Units and Dimensions; Commercial Shapes of Wood; Commercial Shapes for Cast Iron and Steel Castings; Rolling; Circular Shapes; Rectangular Shapes; Angles; I-Beams and Channels; Occasional Shapes; Rare Shapes. WOODEN STRUCTURES. Principles of Design; Accessories of Other Material; Joints; Designs of Timber Structures; General Description of Roof Trusses; Computations for a Roof Truss; Trussed Beams; Description of Bridges; Computations for a Bridge; Trestle Bents. FABRICATION OF STRUCTURAL STEEL. Organization of Administration; Plant in General; Stock Yard; Main Shop; Machine Shop; Forge Shop; Templets; Methods of Cutting Material; Methods of Bending; Process for Upsetting; Method for Making Holes; Layout and Assembly; Fastenings for Steel Work; Methods for Riveting; Inspection Painting and Shipment; Erection. THE ENGINEERING DEPARTMENT. Specifications; Problem of Design; Economical Relations; Estimating; Design of Beams; Design of Tension Members; Design of Compression Members; Strain Sheet; Detailing; Design of Splices and Beam Connections; Design of Riveted and Pin Joints in Trusses; Shoes; Structural Drawings; Auxiliaries; Bills of Materials; Bills of Eyebars, Pins and Accessories; Other Bills; Checking; Other Steps; Examination of Structures in Use; Failures.

Volume II. Design of Simple Structures. 503 pp.

\$4.50

CONTENTS: *Beam Bridges—Plate Girders.* General. I-beam Bridges for Railroads; I-beam Bridges with Solid Floors; I-beam Bridges for Highways—Plank Flooring—Solid Floors; Fences; Open Floor Plate Girder Bridges for Railroads; Stringers for Open Floor Railroad Bridges; Floor Beams for Open Floor Railroad Bridges; Plate Girder Flanges; The Plate Girder Web; Shoes and Bracing for Plate Girders; Solid Floor Plate Girder Bridges for Railroads; Railroad Bridges on Grades, Curves and Skews; Highway Plate Girders; Absolute Maximum Moment; Theory of Stiffener Spacing; Computation for Beams of Variable Depth; Loads and Specifications for Railroad Bridges; Computation of a Half Through Single Track Open Floor Plate Girder Bridge; Details and Comparison of Weights; Loads for Plate Girder Highway Bridges; Specifications for Plate Girder Highway Bridges; Computation for a Plate Girder Highway Bridge; Determination of the Deflection of Plate Girders. *Steel Viaducts and Elevated Railroads.* General. High Viaducts for Railroads; Other Viaducts with X Bracing; Viaducts with Special Bracing—Elevated Railroads; Computation of Partial Bracing and of a Select Viaduct. *Simple Riveted Truss Bridges.* Truss Bridges in General; Weights and Economical Dimensions; Forms of Trusses; Sections and Joints for Riveted Trusses; Floors for Riveted Truss Bridges; Shoes and Their Connections; Bracing; Truss Bridges on Grades, Curves and Skews; Secondary Stresses; Loads and Specifications for Truss Bridges; Lattice Girders—Example; Pony Trusses—Example; Computation of a Railroad Double Track Deck Bridge. *Simple Pin-Connected Bridges.* General. Forms and Sections of Trusses; Splices; The Computation of Pin Joints; Floors and Other Details; Camber; Computations; Design of a Pin-Connected Through Highway Span; Design of a Single Track Pin-Connected Railroad Bridge. *Steel Mill Buildings.* General Outside Coverings; Roof Trusses; Columns; Bracing; Floors; Cranes; Windows, Skylights, Doors and Ventilators; Loads and Specifications; Computations for a Steel Frame Mill Building. *High Office Buildings.* General. Floor Plans; Foundations; Columns; Beams; Floors; Roofs; Cornices; Wind Bracing; Exterior Walls; Partitions; Steel Protection; Requirements for Plumbing and Mechanical Plant; Specifications; Computations for a High Office Building. *Miscellaneous Building Work.* Steel for Brick Buildings; Theaters; Grandstands; Assembly Halls; Railroad Stations; Mine Structures; Miscellaneous Buildings. *Stand-Pipes and Elevated Tanks.* General. Stand-Pipes; Elevated Tanks; Specifications; Design of a Stand-Pipe; Design of an Elevated Tank.

In Preparation

Volume III. Design of Advanced Structures.

CONTENTS: Cantilever Bridges; Continuous Bridges; Movable Bridges; Sus-

pension Bridges; Three-Hinged Arches; Two-Hinged Arches; Continuous Arches; Miscellaneous Structures of Steel.

Presents concisely all structural subjects in connection with wooden structures and the essential principles of design in steel, usually covered in the courses given at technical schools. The fundamental principles of shop practice and erection, which govern the engineer in every step, are clearly developed. Considerable data, original with the author, are included.

USBORNE, F. O. G. *Design of Simple Steel Bridges.* 310 ill., 22 tables, 14 plates, 6 x 9, 410 pp. **\$4.00**

CONTENTS: Bending Moments; Definitions Moments of Resistance; Shear; Deflection; Solid Beams and Examples; Struts and Ties; Rivet Joints; Rolling Loads; Bending Moments, Shear Stresses; Bridge Loads; Plate Girders; Bridge Floors; Railways, Roads; Principles of Bridge Design; Plate Girders; Braced Girders; Shop Practice and General Details.

WALDRAM, P. J. *Principles of Structural Mechanics.* Treated without the use of higher mathematics. 203 ill., $5\frac{1}{2} \times 8\frac{1}{4}$, 395 pp. **\$4.00**

CONTENTS: *Leverage and Graphic Statics.* Force and Reaction; Loads and Stresses; Leverage and Turning Moments; Abbreviated Methods of Calculations; Logarithms and the Slide Rule; *Graphic Statics. Beams and Girders.* Bending Moments; Moment of Resistance; Shear; Deflection. *Walls and Foundations.* Retaining Walls and Buttresses; Foundations. *Roofs.* Graphic Solution of Stresses; Methods of Sections; Wind Pressure; Braced Collar and Hammer-Beam Roofs; Arches and Domes; Columns and Shoring.

Deals thoroughly with first principles and explains not only the application, but also the construction of ordinary formulæ that students require for a thorough and practical understanding of structural details.

WHIPPLE, S. *An Elementary and Practical Treatise on Bridge Building.* *Second Edition, Revised and Enlarged.* 75 ill., $6 \times 9\frac{1}{2}$, 360 pp. **\$3.00**

CONTENTS: Preliminaries; Two, Three, Five and Seven Panel Trusses; Trapezoidal Trusses; Effects of Weight of Structure; Decussation; Deck Bridges; Arch Bridges; Bridge Materials; Iron Bridges; Arch Truss Bridges; Bridges with Parallel Chords; Comparison of Various Bridge Plans; Counter Bracing; Wooden Bridges; Draw Bridges; Modulus of Strength; Lift Draw Bridges.

MASONRY

SPRAGUE, ERNEST H. *Stability of Masonry.* And other structures subject to the pressure of earth and water. 92 ill., 3 folding plates, $4\frac{3}{4} \times 7\frac{1}{2}$, 180 pp. **\$2.00**

CONTENTS: Active and Passive Forces; Effect of Cohesion on the Pressure of Earth; Pressure of Earth on Retaining Walls—The Wedge Theory; Pressure of a Pulverulent Mass; Stability of the Wall; Form and Construction of the Wall; Dams and Chimneys; Foundations; Arches under Hydrostatic and Geostatic Pressure.

TAYLOR, F. N. *Masonry as Applied to Civil Engineering.* A practical treatise on the design and construction of engineering works in stone and heavy concrete. 212 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 241 pp. **\$2.50**

CONTENTS: Stones Used in Constructional Work; Labor on Stones and General Remarks on Masonry; Retaining Walls and Earth Pressures; Dock, Quay, River, Canal and Sea Walls; Masonry Dams; Masonry Bridges; Masonry Towers and Pillars; Monolithic and Block Concrete Construction; Shoring and Underpinning.

THAYER, HORACE R. *Foundations and Masonry.* Ill. *In Preparation.*

CORROSION AND WATERPROOFING

ANDES, LOUIS E. Iron Corrosion, Anti-Fouling and Anti-Corrosive Paints. Translated from the German by Charles Salter. *Second Edition, Revised and Enlarged* by H. B. Stocks. 62 ill., $5\frac{1}{2} \times 8\frac{3}{4}$, 308 pp. **\$6.00**

CONTENTS: Introduction; Iron Rust and Its Formation; Rust Prevention; Anti-Corrosive (Paint-Preventing) Paints; Linseed Varnish and Wood Oil; Pigments; The Influence of the Proportion of Drying Oil on the Durability of the Paint; The Preparation of Anti-Corrosive Paints, Paint Mixing and Grinding Machines; Anti-Corrosive Paints; Testing Paints; Official Standard Specifications for Ironwork Paints in Various Countries.

KEIM, A. W. Prevention of Dampness in Buildings. Translated from the *Second Revised German Edition*. Ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 115 pp. **\$2.50**

CONTENTS: Causes of Dampness and Decay of Masonry; Precautionary Measures During Building; Methods for Remedying Dampness and Efflorescence in Walls of Old Buildings; Artificial Drying; Permanently Efficient Methods; Cause, Origin and Effects of Dry-Rot; Remedies for Dry-Rot and Its Prevention.

HYDRAULICS AND WATER SUPPLY

BINNIE, A. R. Rainfall Reservoirs and Water Supply. Illustrated, 56 plates, 6×9 , 170 pp. **\$4.00**

CONTENTS: Amount, Average and Fluctuations of Rainfall; Probable Average; Flow from the Ground; Intensity of Floods; Evaporation; Quantity and Rate per Head; Quality, Hardness, etc.; Impurities, Filtration; Sources of Supply; Gravitation vs. Pumping; Rivers and Pumping Works; Drainage Areas; Deductions from Rainfall; Compensation; Capacity of Reservoirs; Sites; Puddle Trenches; Concrete Trenches; Base of Embankment; Reservoir Embankments; Puddle Wall; Formation of Embankment; Masonry Dams; Reservoir Outlets; Pipes Through Embankment; Flow Through Culverts; Valve Pit; Central Stopping; Tunnel Outlets; Syphon Outlets; Flood or Bye-Channel; Waste Water-course and Waste Weir; Aqueducts; Conduits; Pipes; Service Reservoir; Distribution; Valves; Meters; House Fittings.

BODMER, G. R. Hydraulic Motors and Turbines. For the use of engineers, manufacturers and students. *Third Edition, Revised and Enlarged*. With 194 ill., $5\frac{1}{2} \times 8\frac{3}{4}$, 579 pp. **\$5.00**

CONTENTS: Turbines; General Theory of Reaction Turbines; Loss of Energy in; Design of; Impulse Turbines; Rules, Formulas, Numerical Examples; Measurement of the Quantity of Flowing Water; Experiments with Turbines; American Machines; Modern Governors; Recent Developments.

CHATLEY, HERBERT. How to Use Water Power. Ill., 5×7 , 92 pp. **\$1.50**

CONTENTS: Sources of Power; Transmission of Power; Hydraulic Press and Its Applications; Water Wheels; Turbines; Pumps; Hydraulic Engines; Tidal Power; Water Supply; Sewage Disposal; Dams.

EKIN, T. C. Water Pipe and Sewer Discharge Diagrams. With tables and charts. 8×11 . **\$3.00**

These diagrams and tables with accompanying descriptive letterpress and examples are based on Kutter's formula with a coefficient of roughness of 0.013 and give the discharges in cubic feet per minute of every inch diameter of pipe from 3 to 48 inches when running full on inclinations from 1 to 15 per 1000. Velocity curves, for every quarter foot, from 2 to 12 feet per second are shown on the diagrams, and amongst the tables is one giving a series of constants for seven other coefficients of roughness whereby the discharges and diameters of pipes—as found from the diagrams—can, by sim-

ply multiplying and dividing, be ascertained for any one of these coefficients. A diagram and table for finding the discharges and velocities in sewers and other pipes when running partially full are included.

FANNING, J. T. *A Practical Treatise on Hydraulic and Water-Supply Engineering.* Relating to the hydrology, hydro-dynamics and practical construction of water-works in North America. *Seventeenth Edition, Revised, Enlarged*, and new tables and illustrations added. 245 ill., $6\frac{1}{4} \times 9\frac{1}{4}$, 650 pp. **\$5.00**

CONTENTS: Quantity of Water Required; Rainfall; Flow of Streams; Storage and Evaporation of Water; Supplying Capacity of Water Sheds; Springs and Wells; Water Impurities; Well, Spring, Lake and River Supplies; Weight, Pressure and Motion of Water; Flow of Water Through Orifices; Through Short Tubes; Through Pipes; Under Pressure; Measuring Weirs and Weir Gauging; Flow of Water in Open Channels; Reservoir Embankments and Chambers; Open Canals; Partitions and Retaining Walls; Masonry Conduits; Mains and Distribution Pipes; Systems; Clarification of Water; Pumping of Water; Tank Stand-pipes; Systems of Water Supply.

FRANCIS, J. B. *Lowell Hydraulic Experiments.* Being a selection from Experiments on Hydraulic Motors, on the flow of water over weirs, in open canals of uniform rectangular section, and through submerged orifices and diverging tubes. *Fifth Edition, Revised and Enlarged.* With additional tables. 23 plates, $10\frac{1}{2} \times 12\frac{3}{4}$, 300 pp. **\$15.00**

CONTENTS: *Experiments on Hydraulic Motors.* Experiments upon the Tremont Turbine; Rules for Proportioning Turbines; Experiments on a Model of a Center-Vent Water-Wheel, with Straight Buckets; Experiments upon the Power of a Center-Vent Water-Wheel, at the Boott Cotton-Mills; Experiments on the Flow of Water over Weirs, and in Short Rectangular Canals. A method of Gauging the Flow of Water in Open Canals of Uniform Rectangular Section, and of Short Length; Experiments on the Flow of Water Through Submerged Orifices and Diverging Tubes; Tables.

FULLER, G. W. *Report on the Investigations into the Purification of the Ohio River Water at Louisville, Kentucky.* Made to the president and directors of the Louisville Water Company. Published under agreement with the directors. 11 full-page plates, $9\frac{3}{4} \times 12$, 469 pp. **\$10.00**

CONTENTS: Composition of Ohio River Water; Chemicals Used by the Several Systems of Purification; Operation of the Respective Systems of Purification: Composition of Water after Treatment; Jewell Filter; Warren Filter; Western Gravity Filter; Western Pressure Filter; Harris Magneto-Electric System; Palmer and Brownell Water Purifier; MacDougall Polarite System; Conclusions.

GIBSON, A. H. *Water Hammer in Hydraulic Pipe Lines.* 15 illus., 5×7 , 68 pp. **\$2.50**

CONTENTS: General Theory of Gradual Closure; Description of Experimental Apparatus; Experimental Results; Gradual Opening of a Valve; Application to the Theory of Turbine Regulation; Speed Regulation Assuming Uniform Pipe Line; Effect of a Stand Pipe on Speed Regulation; Sudden Stoppage of Motion-Theory; Valve Closed Suddenly, but Not Instantaneously; Experimental Results; Sudden Closure in Non-Uniform Pipe Line; Sudden Opening of a Valve; Sudden Opening Neglecting Effect of Elasticity; Further Phenomena Connected with Pipe Flow.

GIBSON, A. H. *Hydraulics and Its Application.* *Second Edition, Revised and Enlarged.* 310 ill., 6×9 , 832 pp. **\$6.00**

CONTENTS: Physical Properties of Water; Cohesion; Adhesion; Capillarity; Surface Tension; Viscosity; Hydrostatics; Pressure Head; Equilibrium of Float-

ing Bodies; Strength of Pipes and Cylinders; Modes of Motion of a Fluid; Vortices; Critical Velocity; Equations of Motions for a Viscous Fluid; Application of Unsteady Motion; Bernonilli's Theorem; Determination of Coefficients of Velocity, Discharge, and Contraction; Equation of Momentum; Orifices; Weirs; Fluid Friction; Resistance of Ships; Measurement of Discharge; Relation between Diameter and Discharge; Pipe Line Losses; Losses at Valves, etc.; Syphons; Flow in Open Channel; Gauging of Flow in Rivers or Open Channel; Impact of Jets on Fixed Vanes; Jet Propulsion; Hydraulic Mining; Rudder Action; Hydraulic Prime Movers; Various Water Wheels, Turbines, Classification of; Governing of Turbine Plants, Stand Pipes, Relays, Gates, and Connections, etc.; General Considerations of Turbine Design; Stand Pipe Theory; The Hydraulic Engine; Port Areas; Pumping Machinery; Displacement Curves; Variation of Pressure in Cylinder; Air Vessels; The Centrifugal Pump; Theory of Action; Compound Multiple Chamber High-Lift Pumps; Examples of Designs; Types of Pumps; The Hydraulic Ram; Hydraulic Power Transmission; Water Meters; Hydraulic Lifts, Jacks, Cranes, Presses, etc.; Appendix.

The hydraulic power engineer and the designer of hydraulic machinery will find this book of great value. It is divided into three sections, the First dealing with HYDROSTATICS and allied problems; the Second with THE MOTION OF WATER and its flow in pipes and open channels, also with SHIP PROPULSION; and the Third with HYDRAULIC MACHINERY, including pumps and turbines. A series of examples have been included at the end of each chapter.

HARPER, JOSEPH H. Hydraulic Tables for the Flow of Water. In circular pipes under pressure, timber flumes, open channels, and egg-shaped conduits with much accessory information. Ill., $4 \times 6\frac{3}{4}$, leather, 192 pp. **\$2.00**

CONTENTS: Introductory; Flowage Tables for Circular Pipes, When Running Full or Under Pressure; Flowage Pipes for Rectangular Open Channels, or Timber Flumes; Flowage Tables for Open Trapezoidal Channels, Ditches and Canals; Egg-Shaped Conduits: First, When Running One-Third Full; Second, When Running Two-Thirds Full, and Third, When Running Full; Miscellaneous Tables and Other Data Convenient for Field Service. A more extended discussion of the Formulas used. *Appendix.* Tables comparing the coefficients of flow and a number of velocity charts contrasting the action of the various formulas.

MARKS, G. C. Hydraulic Power Engineering. A practical manual on the concentration and transmission of power by hydraulic machinery. *Second Edition.* 235 ill. and plates, $5\frac{3}{4} \times 8\frac{1}{4}$. **\$4.50**

CONTENTS: Hydraulics; Observed Flow of Water; Hydraulic Pressures; Materials; Test Load; Pipe Joints; Packing; Controlling Valves; Platform Lifts; Workshop, Foundry, Warehouse and Dock Cranes; Hydraulic Accumulators; Hydraulic Presses, Sheet Metal Working and Forging Machinery; Riveters; Hydraulic Pumps; Turbines; Water Wheels; Hydraulic Engines; Recent Achievements.

MOORE, E. C. S. New Tables for the Complete Solution of Ganguillet and Kutter's Formula for the Flow of Liquids in Open Channels, Pipes, Sewers and Conduits. In two parts. With a large folding diagram. $6\frac{1}{2} \times 9\frac{1}{4}$, 239 pp. **\$6.00**

CONTENTS: Derivation of the Tabulated Quantities; Application of the Tables; List of Values of (*n*) Used; Tables Arranged for 1080 inclinations from 1 Over 1 to 1 Over 21,120 For Fifteen Different Values of (*n*); Table Arranged For Use with Other Values of (*n*).

PARKER, P. A. M. The Control of Water. As applied to irrigation, power and town water supply purposes. 247 ill., $6\frac{1}{4} \times 9$, 1050 pp. **\$6.00**

CONTENTS: Preliminary Data. General Theory of Hydraulics. Gauging of

Streams and Rivers. Gauging by Weirs. Discharge of Orifices. Collection of Water and Flood Discharge. Floods. Dams and Reservoirs. Masonry Dams. Pipes. Open Channels. Filtration and Purification of Water. Problems Connected with Town Water Supply. Irrigation. Movable Dams. Hydraulic Machinery other than Turbines. Water Hammer. Ejectors and Syphons. Air Life and Hydraulic Compressor. Hydraulic Ram. Resistance to Motion of Solid Bodies on Water. Impact of Water on Moving Bodies. Turbines and Centrifugal Pumps. Concrete Ironwork and Allied Hydraulic Construction. Tables. Graphic Diagrams. A manual on hydraulic engineering for practicing engineers engaged in active work, based on the experience gained in eighteen years of independent professional activity. Covering every branch of hydraulics. The subject of floods and their prevention is given special attention.

PRINCE, GEORGE T. Flow of Water. Tabulated data with explanatory notes relating to flow of water under pressure through clean closed pipes. Ill., $4 \times 6\frac{3}{4}$, leather, 154 pp. **\$2.00**

CONTENTS: Historical Notes; Chezy Formula; Kutter Formula; Value of "n" to be Selected with Great Care, etc.; Experimental Value of "n"; D'Arcy Formula; Formulas by Merriman, Fanning Gould and D'Arcy Resolved to Form of $\sqrt{v} = c\sqrt{rs}$; Table No. 1, Average Values of "c" in Above-Mentioned Formulas; Exponential Formula, $H = mV^n$; Lampe Formula; Table No. 2, Values of "m" in $H = mV^n$, Based Upon Assumed Values of "c" in $V = c\sqrt{rs}$ and "n" Equals 2; Experimental Data Relating to Value of "n" in $H = mV^n$; Plotting Flow-Data by Means of Logarithms; Table No. 3, Values of "m" in $H = mV^n$; Explanation of Characters Used in Tables; Diagram D, Showing Geographically Values of "c" in $V = c\sqrt{rs}$ When $V = 4$ Feet: Carrying Capacities of Tuberculated Pipe. *Extend Tables.*

These tables, compiled by the author in connection with his work as chief engineer of the Denver Union Water Company, are intended to assist in the proper dimensioning of pipe conduits to meet the requirements of varying service conditions. The values, computed by five different well known formulas, are given for all sizes of pipe from 4 inches to 120 inches and give figures for discharge in cubic feet per second; U. S. gallons per minute; and million gallons per 24 hours. The value of c has been determined for each size of pipe and slope.

SCHMEER, L. Flow of Water. A new theory on the motion of water under pressure and in open conduits, and its industrial application. Ill., $6\frac{1}{4} \times 9\frac{1}{4}$, 134 pp. **\$1.50**

Starting with the primary laws of pressure, fall and fluid friction, the laws of flow in open and closed conduits are investigated and embodied in a general equation expressing all the variations of the Coeff. c . For practical purposes exponential equations are deduced from the general formula, and extensive tables based on these equations are given. To these are added tables relating to weir flow and tables relating to the most economical diameter of a conduit under pressure. The treatise aims to instruct in the elementary principles of hydraulics, to acquaint the student and investigator with a new theory of flow, finding expression in simple laws embodied in pointed formulæ, and to give the practical man a book of reference, containing useful and precise information on all matters relating to flow.

SPRAGUE, E. H. Hydraulics. A textbook for students and engineers. 80 ill., $5 \times 7\frac{3}{4}$, 196 pp. **\$2.00**

CONTENTS: The Principles of Fluid Pressure; Liquids in Motion; Discharge Through Orifices, Weirs, etc.; Flow in Pipes and Channels; Pressure of Water and Application to Motors; Pumps; Miscellaneous Examples; Useful Data; Mathematical Tables.

TAYLOR, F. N. Small Water Supplies. A practical treatise on the methods of collecting, storing and conveying water for domestic use in country

estates, small villages and farms. 126 ill., $5\frac{1}{2} \times 8$, 180 pp. **\$2.50**

CONTENTS: PROPERTIES OF WATER AND SOURCES OF SUPPLY. Impurities in Water. Tests and Testers. Pollution of Rivers. Sources of Supply: Rivers, Springs, Wells, Rain-Water. Dangers of Well-Water. WELLS AND WELL-SINKING. Excavation. Steining. Brickwork. Concrete. Boring. Use of Explosives. FLOW OF WATER IN CHANNELS AND PIPES. Gauging Flow in Small Streams. "Head." Formulæ. Sizes of Pipes. Syphons. PUMPING WATERS. Hand and Horse Pumps. Hydraulic Rams. Deep Well Pump. Plunger Pump. Single, Double and Treble Ram Pumps. Typical Examples. High-Speed Pumps. Hatfield Pump with Variable Stroke. Centrifugal Pumps. Air-Lift Pumps. Delivery Pipes' Capacity. Driving Engines. Turbines. Windmills. Foundations. STORAGE AND DISTRIBUTION. Pipe Laying. Banks. Masonry Dams. Angle of Repose. Formulæ. Reinforced Concrete. Water Tanks. Filtration. Pipe Jointing. Specimen Distribution Arrangement. Pipes. APPENDIX. NOISES IN WATER PIPES AND THEIR CAUSES. FURTHER NOTES ON ABYSSINIAN TUBE PIPES.

THURSO, J. W. *Modern Turbine Practice and Water Power Plants.* Second Edition, Revised. 88 ill., $6\frac{3}{4} \times 9\frac{1}{2}$, 266 pp. **\$4.00**

CONTENTS: *Modern Turbine Practice*; Turbine Practice in Europe and America; Classification of Turbines; Steam Turbines; Modern Turbine Types and Their Construction; Accessories to Turbines; Governors and Speed Regulators; *Water Power Plants*; Water Conductors; Development; British and Metric Measures and Values; Elements of Design Favorable to Speed Regulation in Plants Driven by Water Power, by A. V. Garratt.

TILLMANS, J. *Water Purification and Sewage Disposal.* Translated by Hugh S. Taylor. 21 ill., 6×9 , 169 pp. **\$2.50**

CONTENTS: WATER PURIFICATION. Ground, Spring, and Surface Water. Purification of Water for Drinking Purposes on the large Scale. Purification of Drinking Water on the Small Scale. SEWAGE DISPOSAL. Mechanical Purification of Sewage. Degener's Coal-Pulp Process. Biological Purification of Sewage. Disposal and Profit from the Resulting Residues. Purification of Industrial Sewage. Purification of Industrial Sewage in Detail. Disinfection of Sewage.

This work embodies a critical survey of the work of the German authorities during the past few years in developing modern methods for the provision of suitable water supplies and the adequate disposal of sewage. The chapter on the disposal of industrial sewage should be very interesting.

WEGMANN, EDWARD. *Conveyance and Distribution of Water For Water Supply; Aqueducts, Pipe-Lines and Distributing Systems.* A practical treatise for water-works engineers and superintendents. 367 ill., 8 plates, $6\frac{1}{2} \times 9\frac{1}{4}$, 669 pp. **\$5.00**

CONTENTS: *Water Consumption and Hydraulic Formulas.* Consumption of Water; Flow of Water in Aqueducts; Flow of Water Through Orifices and Pipes. *Design and Construction.* Wooden Pipes; Cast Iron Pipes; Wrought Iron and Steel Pipes; Pipes of Vitrified Stone Ware, Cement and Concrete; Stresses in Water Pipes; Flexible Pipe-joints; Submerged Pipes; Gates and Valves; Hydrants; Intake Pipes and Tunnels; Aqueducts; Description of Aqueducts; Service Reservoirs; Stand-Pipes; Cylindrical Tanks of Wood or Steel; Fire Protection; High Pressure Water Systems; Distribution Systems. *Maintenance and Operation.* Service Pipes for Connections; Cleaning Aqueducts and Water Mains; Thawing Frozen Pipes and Hydrants; Leakage from Aqueducts, Mains, and Service Pipes; Durability of Wooden and Metal Pipes; Electrolysis; Tools and Machines for Pipe Work; Detection and Prevention of Waste of Water; Pitot Tube Gauging; Water Meters; Recording Instruments. *Appendices.* Standard Specifications of American Water Works Association for "Cast Iron Water Pipe and Special Castings," Hydrants and Valves, "Structural and Boiler Steel"; Special Fire Protection for Buildings; Fire Stream Tables Prepared by National Board of Fire Underwriters.

WESTON, E. B. Tables Showing Loss of Head Due to Friction of Water in Pipes. *Fifth Edition.* $4\frac{1}{8} \times 6\frac{1}{4}$, flexible leather, 171 pp. \$2.00

CONTENTS: Table No. 1: Loss of Head Due to Friction of Water in Pipes Having Very Smooth Interior Sides Similar to Lead and Brass Pipes, Including a Description, Examples and a Supplementary Table; Table No. 2: Loss of Head Due to Friction of Water in Pipes Having Interior Sides Similar to New Cast-Iron Pipes, Including a Description, Examples and Two Supplementary Tables.

IRRIGATION

BROWN, H. Irrigation. Its principles and practice as a branch of engineering. *Second Edition, Revised.* 67 ill., $6\frac{1}{4} \times 9\frac{1}{4}$, 316 pp. *Reprinting*

CONTENTS: Irrigation and its Effect; Basin Irrigation; Perennial Irrigation and Water "Duty"; Sources of Supply; Dams and Reservoirs; Means of Drawing on the Supply; Methods of Construction; Means of Distribution; Masonry Works on Irrigation Canals; Methods of Distribution of Water, Assessment of Rates, and Administration; Flood Banks and River Training; Agricultural Operations and Reclamation Works; Navigation; Weights and Measures; Formulas and Discharge Measurements; Books of Reference.

MACKENZIE, N. F. Notes on Irrigation Works. A course of lectures delivered at Oxford under the auspices of the common university fund. Ill., 6 folding plates, $5\frac{3}{4} \times 8\frac{3}{4}$, 119 pp. \$2.50

(Author was under-secretary for irrigation to the Government of India.)

CONTENTS: Introductory; Statistics required for Preparing an Irrigation Project; Types of Weirs; The Development of Irrigation in Egypt since 1884; On the Design of Irrigation Channels; Irrigation Revenue and Land Revenue in India. Some of the many problems in engineering and economics that have to be solved by the irrigation expert are dealt with in this book. The descriptions given are almost entirely of examples of irrigation works in India and Egypt, as these contain, probably, the most interesting object lessons in modern scientific irrigation.

SEWERAGE AND SEWAGE DISPOSAL

ADAMS, HENRY C. The Sewage of Sea Coast Towns. Ill., 6×9 , 142 pp. \$2.50

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WANSBROUGH, W. D. *The A B C of the Differential Calculus. Second Edition.* Ill., 30 figures, $5\frac{1}{4} \times 7\frac{1}{2}$, 160 pp. **\$2.50**

CONTENTS: The Differential Coefficient; Limit; Differentiation; Rules for Differentiation; Successive Differentiation; The Differential Coefficient as the Tangent to a Curve; Uniform and Variable Velocity; Maxima and Minima.

HIGHER MATHEMATICS

BAKER, ARTHUR L. *Quaternions as the Result of Algebraic Operations.* 39 ill., $5\frac{1}{2} \times 7$, 100 pp. **\$1.50**

CONTENTS: Mathematical Operations Upon Discrete Magnitudes. Idiographs. Multiplication of Unit Vectors. Quaternions. Kinds of Quaternions. Quaternion Operators. Products of Quaternions. Versors. Interpretation of Vector Equations. Quaternion Equations of the First Degree. Applications of ϕ . Appendix: Functional Symbols.

Beginners in the subject of Quaternions are generally bewildered by the arbitrary manner in which the subject is usually developed. They are forcibly introduced into a new domain where the familiar rules of combination of symbols are not valid. New magnitudes are arbitrarily assumed, subject to arbitrary rules. He finds the logic consistent with the results concordant with those of his previous courses, but he hardly knows why. He is in a new country, safe, but thoroughly and bewilderingly uncertain as to how he got there. In the attempt to avoid this uncertain journey, to lead the student from the known to the unknown by familiar steps, such that require no arbitrary limitations of former laws, but merely their adaptation to new circumstances, these class notes are presented in their present shape.

GUNTHER, C. O. *Integration by Trigonometric and Imaginary Substitution.* With an introduction by J. Burkitt Webb. *Second Edition, Corrected.* Ill., $5\frac{1}{2} \times 8$, 85 pp. **\$1.50**

(Author is professor of mathematics at Stevens Institute of Technology.)

CONTENTS: Imaginary Quantities; Exponentials; Explanation of Figures and Tables; Analytical Trigonometry; Interrelations; Integration; Classification; Trigonometric Differentials; Rationalization by Trigonometric Substitution; Answers to Examples.

HILL, M. J. M. *The Theory of Proportion.* Ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 128 pp. **\$2.50**

CONTENTS: Magnitudes of the Same Kind; Propositions Relating to Magnitudes and Their Multiples; Relations between Multiples of the Same Magnitude; Commensurable Magnitudes; Magnitudes of the Same Kind Which Are Not Multiples of the Same Magnitude; Incommensurable Magnitudes; Extension of the Idea of

Number; On the Ratios of Magnitudes which have no Common Measure; Properties of Equal Ratios; First, Second and Third Groups of Propositions; Geometrical Applications of Stolz' Theorem; Further Remarks on Irrational Numbers; Existence of the Fourth Proportional; Commentary on the Fifth Book of Euclid's Elements.

PEIRCE, BENJAMIN. *Linear Associative Algebra.* $9\frac{1}{2} \times 12$, 133 pp. \$2.50

A reprint from the *American Journal of Mathematics* of 1882 of a paper issued in 1870 by the author on pure mathematics carrying algebra beyond quaternions to what might be called sextuple algebra, or an algebra of six letters just as quaternions is one of four letters.

RICE, J. M., and JOHNSON, W. W. *On a New Method of Obtaining the Differential of Functions.* With especial reference to the Newtonian conception of rates or velocities. 5×7 , paper, 32 pp. \$0.50

CONTENTS: The Newtonian Method of Fluxions; Proposed Method of Treating the Differential Calculus; Algebraic Functions; Transcendental Functions.

LOGARITHMS AND SLIDE RULE

CARY, E. R. *Solution of Railroad Problems by the Slide Rule.* 43 ill., 4×6 , 146 pp. \$1.00

(Author is professor of Railroad Engineering and Geodesy in Rensselaer Polytechnic Institute Troy, N. Y.)

CONTENTS: The Slide Rule. Simple Curves. Compound Curves. Vertical Curves. Turnouts. The Easement Curve. Earthwork. Problems. Diagrams. Tables.

CHAMBERS' Mathematical Tables, Consisting of Logarithms of Numbers 1 to 108,000, Trigonometrical, Nautical and other Tables. Edited by James Pryde. *New Edition.* $5\frac{3}{4} \times 8$, cloth, 496 pp. \$2.50

CONTENTS: Tables of: Logarithms of Numbers; Logarithmic Sines, Tangents and Secants; Circular Measure of Angles; Natural Sines, Cosines, Versed Sines, Chords, etc.; Natural Tangents; Natural Secants; Traverse Tables; Diurnal and Ternary Proportional Logarithms; Meridional Parts; Amplitudes; Reduction of Degrees to Time; Reduction of Time to Degrees; Quarter Squares, Nos. 1 to 5100; Conversion of the Different Thermometric Scales and many others.

CHAPPELL, E. *Five Figure Mathematical Tables.* 6×9 , 340 pp. \$2.50

CONTENTS: Logs of numbers from 1 to 40,000; Cologs of numbers from 1 to 40,000; Antilogs or numbers from .0000 to .9999; Logs of the Logs (Lologs) of Numbers from 0.00100 to 1.000; Antilogs of Numbers from 6.0 to 0.50000; Trigonometrical functions and their logs.

This work is notable for the exceptionally elaborate tables of cologs and antilogs and for the unique tables of lologs (logs of logs of numbers) and antilologs. The table of cologs permits of the elimination of even subtraction in most cases so that arithmetical calculation may be performed to a very considerable extent by the one operation of addition. The table is of unusual elaboration, permitting of an accuracy corresponding to that obtainable by use of the five place tables, and is not of the customary abridged and practically useless variety. The tables of lologs and antilologs permit the most intricate arithmetical processes of involution and evolution to be performed as ordinary logarithmic processes, viz., by addition and subtraction only. The log and trigonometrical tables are so arranged as to be more convenient to use than any five-place tables hitherto published.

HALSEY, F. A. *The Use of the Slide Rule. Fourth Edition, Revised and Enlarged.* 18 ill., 7 folding plates, $3\frac{3}{4} \times 6$, boards, 96 pp. (Van Nostrand's Science Series, No. 114) \$0.75

CONTENTS: Principle of the Slide Rule; Mechanical Addition; Multiplication;

Multiplication of Mixed Numbers; Finding the Decimal Point; Division; Multiplying by Vulgar Fractions; The Runner; Reducing Vulgar Fractions to Decimals; Squares and Square Roots; Areas of Circles; Slide Rule Formulas; Gage Points; The Inverted Slide; The Circular Slide Rule; Extended Scale Instruments; Special Slide Rules; Some Special Forms of Computers; Calculating Cone Pulleys and Back Gearing Ratios.

KNOTT, C. G. Four-Figure Mathematical Tables. $5 \times 7\frac{1}{4}$, 24 pp. \$0.25

PICKWORTH, C. N. Logarithms for Beginners. *Third Edition*. $5 \times 7\frac{1}{4}$, 58 pp. \$1.00

CONTENTS: Preliminary Notes and Definitions; Logarithms; Calculation by Logarithms; The Four Rules; Tables of Logarithms; Antilogarithms; Tables of Antilogarithms; Calculations Involving Negative Characteristics; Examples in Logarithmic Computation; Higher Power Tables of Common Logarithms; Logarithms of Reciprocals; Logarithms to Bases Other than 10; Hyperbolic Logarithms; Tabular Logarithms of Trigonometrical Ratios; Answers; Tables; Four-Figure Logarithms; Logarithms of Useful Factors; Antilogarithms.

PICKWORTH, CHARLES N. The Slide Rule. A practical manual. *Twelfth Edition*. 34 ill., $5 \times 7\frac{1}{4}$, 118 pp. \$1.50

Describes the principle on which the slide rule operates, with detailed instructions for making the various kinds of calculations possible on it.

Pocket Logarithms, to Four Places of Decimals, including Logarithms of Numbers, and Logarithmic Sines and Tangents to Single Minutes; and Natural Sines, Tangents and Cotangents. $3\frac{3}{4} \times 6$, boards, 140 pp. (Van Nostrand Science Series, No. 65.) \$0.75

VEGA, VON, BARON. Logarithmic Tables of Numbers and Trigonometrical Functions. Translated from the *Fortieth*, or Dr. Bremiker's *Thoroughly Revised and Enlarged Edition*, by W. L. F. Fischer. *Eighty-first Edition*. 6×9 , 603 pp. \$2.50

CONTENTS: Briggs or Common Logarithms of the Natural Numbers from 1 to 100,000; Logarithms of the Sines and Tangents from Second to Second; Logarithms of the Trigonometrical Functions from Ten to Ten Seconds; Table for the Conversion of Sidereal Time into Mean Time and Mean Time into Sidereal Time; Tables of Refraction; Constants.

MECHANICAL ENGINEERING

MECHANICS

BOWSER, E. A. *An Elementary Treatise on Hydromechanics.* With numerous examples. *Sixth Edition.* 84 ill., $5 \times 7\frac{1}{4}$, 308 pp. **\$2.50**

CONTENTS: Equilibrium and Pressure of Fluids; Equilibrium of Floating Bodies; Specific Gravity; Equilibrium and Pressure of Gases; Elastic Fluids; Motion of Liquids; Efflux; Resistance and Work of Liquids; Motion of Water in Pipes and Open Channels; Motion of Elastic Fluids; Hydrostatic and Hydraulic Machines.

BOWSER, E. A. *An Elementary Treatise on Analytic Mechanics.* With examples. *Twenty-third Edition.* 102 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 525 pp. **\$3.00**

CONTENTS: First Principles; Composition and Resolution of Concurring Forces; Conditions of Equilibrium; Composition and Resolution of Forces Acting on a Rigid Body; Center of Gravity; Friction; Principle of Virtual Velocities; Machines; The Funicular Polygon; The Catenary; Attraction; *Kinematics*; Rectilinear Motion; Curvilinear Motion; *Kinetics*; Laws of Motion; Central Forces; Constrained Motion; Impact; Work and Energy; Moment of Inertia; Rotatory Motion; Motion of a System of Rigid Bodies in Space.

CATHCART, W. L., and CHAFFEE, J. I. *The Elements of Graphic Statics and of General Graphic Methods.* 159 ill., 6×9 , 318 pp. **\$3.00**

CONTENTS: Graphic Arithmetic. Graphic Measurement of Areas. Forces: Concurrent, Non-concurrent, Non-parallel. Parallel Forces. Couples. Centre of Gravity. Moments. Fundamental Theory of Beams. Roof Trusses. Braced Cantilevers. Bridge Trusses, Plate Girders. Graphics of Friction. Moment Diagrams of Shafting.

An extension of a course of lectures prepared jointly by the authors for students of marine and mechanical engineering and naval architecture, in their classes at Webb's Academy and Columbia University. Graphical methods have had their widest application in the analysis of the stresses in stationary structures, and, therefore, the majority of the text-books on this subject have been written for the use of students of civil engineering. To meet the needs of the authors' classes and of mechanical and marine engineers in general, treatment of a wider range is essential, and this book gives a brief review of the fundamental principles of graphics and of their application to beams, trusses, and the elements of mechanism. The discussion of methods has been very fully illustrated by diagrams, occasional references have been furnished to sources of additional information, numerous problems have been assigned to test the students' knowledge of the subject, and, wherever necessary, brief explanations of the fundamental principles of mechanics and of strength of material have been given.

CATHCART, W. L., and CHAFFEE, J. I. *A Short Course in Graphic Statics for Students of Mechanical Engineering.* 58 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 190 pp. **\$1.50**

CONTENTS: "Force and Equilibrium Polygons. Trusses: Stress: Diagrams. Stationary Loads: Shears and Moments. Live Loads: Shears and Moments. Center of Gravity: Moment of Inertia. Friction.

Aims to provide students of mechanical engineering with a brief course in graphic statics that will serve when the time to be devoted to the subject is short. The treatment has been restricted mainly to the properties and uses of the force and equilibrium polygons as being sufficient for the solution of most of the problems met in practice by mechanical engineers.

DADOURIAN, H. M. *Analytical Mechanics for Students of Physics and Engineering.* *Second Edition, Revised and Enlarged.* 300 diagrams, $6\frac{1}{2} \times 9\frac{1}{4}$, 446 pp. **\$3.00**

(Author is instructor in physics in the Sheffield Scientific School of Yale University.)

CONTENTS: Table of Notations. Introduction; Addition and Resolution of Vectors; Equilibrium of a Particle; Equilibrium of a Rigid Body; Equilibrium of Framed Structures; Graphic Statics; Equilibrium of Flexible Cords; Motion; Motion of a Particle; Center of a Mass and Moment of Inertia; Work; Energy; Fields of Force and Newtonian Potential; Motion of a System of Particles; Uniplanar Motion of a Rigid Body; Impulse and Momentum; Angular Impulse and Angular Momentum; Motion of a Particle in a Central Field of Force; Periodic Motion; Appendix. Table of Units and Their Equivalents; Note on the Order of Working Out Problems; Mathematical Formulas; Mathematical Tables.

Aims to present the subject in such a manner as to enable students to acquire a firm grasp of the fundamental principles of Mechanics and to apply them to problems with the minimum amount of mental effort without, however, reducing the book to a collection of rules, mnemonic forms and formulas. This new edition was entirely revised and much enlarged by the addition of much new text and illustrative matter.

DADOURIAN, H. M. Graphic Statics and a General Method For Working on Problems in Mechanics. Ill., 6 x 9, boards, 50 pp. **\$0.75**

The fourth chapter of the second edition of Dadourian's "Analytical Mechanics" is reprinted in this volume as a separate book, in order to satisfy the needs of classes in Graphic Statics and the Equilibrium of Framed Structures. The book contains "A General Method for Working on Problems in Mechanics" and also a table of logarithms.

HANCOCK, H. Text-book of Mechanics and Hydrostatics. 500 ill., 5 x 7½, 415 pp. **\$1.50**

CONTENTS: Motion; Velocity and Acceleration; Relative and Angular Velocity; Mass; Force; Weight; Motion Under Gravity and on Smooth Planes; Inertia and the Laws of Motion; Force and Forces; Moments and Couples; Mass Center and Center of Gravity; Equilibrium; Hinges; Friction; Energy and Work Examples; Machines; Fluid Pressure; Specific Gravity; Flotation and Equilibrium; Pressure of Gases; Instruments; Appendices.

HECK, ROBERT C. H. Notes on Elementary Kinematics. 57 ill., 6 x 9, boards, 62 pp. **\$1.00**

CONTENTS: Introduction. The Crossed Slider-crank: Harmonic Motion. The Engine Mechanism. The Offset Stroke-line. Distorted Harmonic Motion. Valve Diagrams. Velocity Relations. Velocity Diagrams. Quick-return Motions. Reducing Motions. Gear-tooth Profiles. Directions and Data for Drawing Problems.

Aims to lay out a simple, practical course, not covering a very wide range of mechanism, but to set forth the best and clearest methods of work. The kinematics of more complex linkages and of higher-pair mechanism—cams, non-circular wheels, and the like—is entirely deferred, except for a brief study of the standard gear-tooth profiles.

HECK, ROBERT C. H. Notes on the Graphics of Machine Forces. 39 ill., 6 x 9, boards, 48 pp. **\$1.00**

CONTENTS: General Conditions of Problems. Force Diagram Constructions. The Action of Friction. Journal Friction. The Efficiency of Machines. Resistance to Rolling. Toothed-gear, Chain and Rope Resistances. Belt Transmission. General Procedure. Special Force Constructions. Friction and Lubrication.

The book sets forth the underlying mechanical principles, adapting them to the particular line of application, and develops methods as the student needs them for use in the problems. Simple examples of typical force actions and constructions are fully explained, but the working problems are neither given nor solved in the notes. The actual work of the course is done upon prepared problems, in the form of full-size, dark-line prints; the use of these saves all labor of merely cleaning the machine, and the force determination

can be taken up at once. On the print there is room for such special notes and suggestions as may be called for; but the emphasized purpose is to have the student think for himself, with needed help and suggestion from the instructor, and not follow a ready worked-out example.

HERRMANN, G. *The Graphical Statics of Mechanism.* A guide for the use of machinists, architects and engineers; and also a text-book for technical schools. Translated and annotated by A. P. Smith. *Sixth Edition.* 8 folding plates, $4\frac{1}{4} \times 7\frac{1}{2}$, cloth, 168 pp. **\$2.00**

CONTENTS: Efficiency of Mechanisms; Equilibrium of Mechanisms; Sliding, Journal, Rolling, and Chain Friction; Stiffness of Ropes; Tooth Friction; Belt Gearing; Examples.

HOUGHTON, C. E. *The Elements of Mechanics of Materials.* A text for students in engineering courses. *Second Edition, Revised and Enlarged.* Ill., $5\frac{1}{2} \times 8\frac{1}{2}$, 230 pp. **\$2.50**

CONTENTS: Applied Mechanics. Applications. Beams. Torsion. The Elastic Curve. Long Columns. Combined Stresses. Compound Bars and Beams.

Intended for use as an elementary text-book and presupposes a knowledge of mathematics through integral calculus, mechanics and physics. Designed to be an elementary text-book for students in the engineering courses in colleges and universities, where the time allotted to the subject does not exceed three or four recitations per week, for one half year, and where the course is preceded by college courses in mathematics, through integral calculus, mechanics and physics. The extreme mathematical treatment of the subject has been avoided, but where the use of higher mathematics lead to clearness they have been used freely. As it is intended as a text-book, the general cases are discussed fully, leaving the student to derive the formulas for special cases as part of the regular problem work. At the end of each chapter there are review questions covering the more important parts of the subjects discussed and problems illustrating them, the solution of one problem of each type being given to show the application of the general formula. An appendix contains tables giving the values of the engineering constants of materials and the formulas commonly used in design, in addition to the tables usually found in books of this character.

LODGE, O. J. *Elementary Mechanics, Including Hydrostatics and Pneumatics.* *New Edition, Completely Revised,* by the author and by Alfred Lodge. Answers revised by C. S. Lodge. 106 ill., $5\frac{1}{4} \times 7\frac{1}{4}$, 324 pp. **\$1.50**

CONTENTS: Motion (Kinematics); Translation, or Motion of a Point; Rotation, or Motion of an Extended Body; Rectilinear Motion; Composition of Motions; On Quantity of Matter and Quantity of Motion; On Force and Motion (Dynamics); Work and Energy; Composition and Resolution of Forces; On Equilibrium; On Machines, or the Rudiments of Applied Mechanics; Properties and States of Matter; The Pressure of Gravitating Liquids at Rest; Floating Bodies; On the Pressure of the Atmosphere, and on the Properties of Gases; Miscellaneous Exercises.

MILLS, CLIFFORD N. *A Short Course in Elementary Mechanics for Engineers.* 36 ill., $4\frac{1}{2} \times 6\frac{3}{4}$, 137 pp. **\$1.00**

(Author is professor of mathematics in the South Dakota State College of Agriculture and Mechanic Arts.)

CONTENTS: Introduction; Definitions, etc.; Kinematics; Linear and Angular Motion; Vectors; Kinetics; Statics; Compensation and Resolution of Forces; Motion in a Circle; Energy of Rotation; Moments of Inertia; Tables; Answers. An elementary short course for students familiar with trigonometry, arranged systematically and written from the "definition viewpoint." Following the theory that it is by solving problems that a mastery of mechanics is gained, the author has included many problems of varying complexity throughout

the text. To assist the student in knowing whether he has arrived at correct solutions a section of the book gives answers to the problems.

PEIRCE, B. *System of Analytic Mechanics.* $8\frac{3}{4} \times 10\frac{1}{4}$, 536 pp. **\$10.00**

CONTENTS: Motion, Force and Matter; Measure of Motion and Force; Fundamental Principles of Rest and Motion; Elements of Motion; Forces of Nature; Equilibrium of Translation, Of Rotation, Of Equal and Parallel Forces; Action of Moving Bodies; Integration of the Differential Equations of Motions; Motion of Translation; Of Rotation; Of Systems; Appendix.

RANKINE, W. J. M. *A Manual of Applied Mechanics. Eighteenth Edition, Thoroughly Revised,* by W. J. Millar. 270 ill., 6×8 , 694 pp.

Reprinting

CONTENTS: Harmony of Theory and Practice in Mechanics; *Statics*; Balance and Measurement of Forces Acting in a Straight Line; Theory of Couples and of the Balance of Parallel Forces; Balance of Inclined Forces; Parallel Projections; Distributed Forces; Stable and Unstable Equilibrium; *Theory of Structures*; Definitions and General Principles; Stability, Strength and Stiffness; *Cinematics*; Motions of Points; Motions of Rigid Bodies; Motions of Pliable Bodies and of Fluids; *Mechanism*; Elementary Combinations and Trams of Mechanism; Aggregate Combinations; *Dynamics*; Uniform Motion Under Balanced Forces; Varied Translation of Points and Rigid Bodies; Rotations of Rigid Bodies; Hydrodynamics; *Theory of Machines*; Work of Machines with Uniform and Periodic Motion; Varied Motions of Machines; Prime Movers.

RANKINE, W. J., and BAMBER, E. F. *A Mechanical Textbook, or Introduction to the Study of Mechanics. Fifth Edition.* 158 ill., $5\frac{3}{4} \times 8$, 324 pp. **\$4.00**

CONTENTS: *Mathematical Introduction*; Arithmetical and Trigonometrical Rules; Rules of the Differential and Integral Calculus; Mensuration and Finding Centers of Magnitude; Elementary, Mechanical Notions; *Cinematics*; Motions of Points, Rigid Bodies, Pliable Bodies and Fluids; *Mechanism*; Definitions and Principles; Elementary Combinations and Trams of Mechanism; Aggregate Combinations; *Statics*; Principles; Composition, Resolution and Balance of Forces; Distributed Forces; *Structures*; Stability and Strength; Rules of Strength and Stiffness; *Kinetics*; Principles; Uniform Motion Under Balanced Forces; Translations of Points and Rigid Bodies; Rotations of Rigid Bodies; Motions of Fluids; *Machines*; Performance, Regulating Apparatus; Efficiency and Counter Efficiency of Pieces; Combinations and Trams in Mechanism.

STAHL, A. W., and WOODS, A. T. *Elementary Mechanism.* A textbook for students of mechanical engineering. *Seventeenth Edition*, 198 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 319 pp. **\$2.25**

CONTENTS: Elementary Propositions; Communication of Motion by Rolling Contact; Velocity Ratio Constant; Directional Relation Constant; Communication of Motion by Sliding Contact; Velocity Ratio Constant; Directional Relation Constant; Teeth of Wheels; Velocity Ratio and Directional Relation Constant or Varying; Communication of Motion by Linkwork; Communication of Motion by Wrapping Connections; Trains of Mechanism; Aggregate Combinations; Problems.

TEMPLETON, WM. *The Practical Mechanic's Workshop Companion.* Comprising a great variety of the most useful rules and formulas in mechanical science, with numerous tables of practical data and calculated results for facilitating mechanical operations. *Nineteenth Edition, Revised*, modernized and considerably enlarged by Walter S. Hutton. Ill., $4\frac{1}{4} \times 6\frac{1}{2}$, leather, 484 pp. **\$2.00**

WEISBACH, J. *A Manual of Theoretical Mechanics.* Translated from the fourth augmented and improved German edition by Eckley B. Coxe. *Tenth American Edition.* 902 ill., $6\frac{3}{4} \times 9\frac{1}{2}$, 1112 pp. **\$6.00**

CONTENTS: Introduction to the Calculus; Simple and Compound Motion; Fundamental Principles and Laws of Mechanics; Mechanics of a Material Point; General Principles of Rigid Bodies; Center of Gravity; Equilibrium of Bodies; Rigidly Fastened and Supported; Equilibrium of Funicular Machines; Resistance of Friction and Rigidity of Cordage; Elasticity and Strength of Extension, Compression and Shearing; Elasticity and Strength of Flexure or Bending; Combined Elasticity and Strength; Moment of Inertia; Centrifugal Force; Action of Gravity; Impact; Equilibrium and Pressure of Water; Molecular Action of Water; Equilibrium and Pressure of the Air; Flow of Water from Vessels and Through Pipes; Water Under Pressure; Flow of Water in Canals and Rivers; Hydrometry; Impulse and Resistance of Fluids; Theory of Oscillation.

WRIGHT, T. W. *Elements of Mechanics; Including Kinematics, Kinetics, and Statics.* *Eighth Edition, Revised.* Ill., $5\frac{3}{4} \times 8$, 388 pp. **\$2.50**

CONTENTS: Kinematics; Motion; Matter in Motion; Newton's Laws; Dynamics of a Particle; Statics of a Body; Friction; Work and Energy; Dynamics of Rotation; Elastic Solids; Impact; Metric Units; Dimensions of Units; Tables; Synopsis for Ready Reference.

HEAT—THERMODYNAMICS

DRAPER, CHARLES H. *Heat and the Principles of Thermodynamics.* *New and Revised Edition.* 193 ill., $5\frac{3}{4} \times 8$, 444 pp. **\$2.25**

CONTENTS: Units of Measurement. Symbols. Formula. EXPERIMENTAL. Temperature. The Thermometer. Expansion of Solids, Liquids, and Gases. Remarks on Expansion. Specific Heat—Calorimetry. Liquefaction and Solidification. Latent Heat. Properties of Vapors. Ebullition. Latent Heat. Liquefaction of Gases. Hygrometry. Heat and Electricity. Conductivity. Thermo-Chemistry. Radiation. Measurement of Temperature. PRINCIPLES OF THERMODYNAMICS. Work and Energy. Mechanical Equivalent of Heat. The Kinetic Theory. Internal and External Work. Isothermal Curves. Continuity of State. Specific Heats of Gases. Adiabatic Changes and Curves. Heat Engines. Theory of Heat Engines. Some Applications of Carnot's Principle. Miscellaneous Examples and Exercises. Appendix. Answers to Exercises.

The subject matter in this new edition has been revised and rewritten in order that the book may be in accord with the recent advances made in the methods of heat measurement and the theories brought to light by recent investigations.

ENNIS, WILLIAM D. *Applied Thermodynamics for Engineers.* *Fourth Edition, Corrected.* 316 ill., $6\frac{1}{2} \times 9\frac{1}{2}$, 514 pp. **\$5.00.**

CONTENTS: The Nature and Effects of Heat. The Heat Unit. Specific Heat First Law of Thermodynamics. Laws of Gases. Absolute Temperature. The Perfect Gas. Thermal Capacities. Specific Heats of Gases. Joule's Law. Graphical Representations. The Carnot Cycle. The Second Law of Thermodynamics. Entropy. Compressed Air. Hot Air Engines. Gas Power. Theory of Vapors. The Steam Engine. Modified Cycle. Multiple Expansion. Engine Testing. The Steam Turbine. Results of Trials of Engines and Turbines. The Steam Power Plant. Distillation. Fusion. Liquefaction of Gases. Mechanical Refrigeration.

The author's aim has been to prepare a manual on the fundamental principles of heat machinery that will be useful in the class-room and the laboratory, and to the designer. The subject is treated from the physical standpoint and as related to its engineering applications. Differential equations have been almost wholly eliminated, the mathematical complications have been as far as possible avoided, and the rule has been kept in mind to employ the Calculus only in the few places where it really makes things simpler. This new edition represents a

careful and comprehensive revision of the original book which was very enthusiastically received and used as a text in many of the best universities in the country. Answers to many of the numerical problems have been incorporated and additional problems set.

HIRSCHFELD, C. F. *Engineering Thermodynamics. Second Edition.* Ill., $3\frac{3}{4} \times 6$, cloth, 162 pp. (Van Nostrand's Science Series, No. 45.) **\$0.75**

CONTENTS: Heat; Gases; Entropy; Cycles; Flow of Gases; Vapors; Expansion and Compressions of Vapors; Vapor Cycles; Flow of Vapor.

KLEIN, J. F. *Physical Significance of Entropy, or the Second Law.* $6\frac{1}{4} \times 9\frac{1}{4}$, 108 pp. **\$1.50**

(Author is professor of mechanical engineering at Lehigh University.)

CONTENTS: Introduction. The Definitions, General Preliminaries, Development, Current and Precise Statements of the Matters Considered. Concerning the Application of the Calculus of Probabilities. Analytical Expressions for a few Primary Relations. The Physical Interpretations. Summary of Connection between Probability, Irreversibility, Entropy, and the Second Law. Reach and Scope of the Second Law.

PARTINGTON, JAMES R. *A Text-book of Thermodynamics* (with special reference to Chemistry.) 91 diagrams, 6×9 , 550 pp. **\$4.00**

CONTENTS: Thermometry and Calorimetry. The First Law of Thermodynamics and Some Applications. The Second Law of Thermodynamics; Entropy. The Thermodynamic Functions and Equilibrium. Fluids. Ideal and Permanent Gases. Changes of Physical State. Vander Waals' Equation and the Theory of Continuity of States. Thermochemistry. Gas Mixtures. Elementary Theory of Dilute Solutions. General Theory of Mixtures and Solutions. Capillarity and Adsorption. Electrochemistry. The Theorem of Nernst. Kinetic Theories in Thermodynamics. Expounds the principles of thermodynamics and illustrates their applicability to the various problems of physical chemistry. Chemical problems receive the main consideration and other branches are either briefly treated or omitted. The author aims to show that a comprehension of the fundamentals of thermodynamics may be applied advantageously to the solution and interpretation of modern experimental work.

ZEUNER, A. *Technical Thermodynamics. Second Edition.* Translated from the *Fifth, Completely Revised, German Edition* of Dr. Zeuner's original treatise on thermodynamics by J. F. Klein. Two volumes. Ill., $6\frac{3}{4} \times 9\frac{1}{2}$. **\$8.00**

CONTENTS: Fundamental Equations of Thermo-Dynamics; Theory of Gases; Reversible Changes in the State of a Gas; Reversible and Non-Reversible Changes of State of Gases; Flow and Efflux of Gases; Theories of Air Engines; Internal-Combustion Engines; Vapors; Reversible and Non-Reversible Change of Wet Vapors; Flow and Efflux of Wet Vapors; Reversible and Non-Reversible Changes of Superheated Vapor of Water; Theory of Steam Engines; Tables.

FUELS

BRISLEE, F. J. *An Introduction to the Study of Fuel.* A text book for those entering the engineering, chemical and technical industries. 60 ill., $6\frac{1}{4} \times 9$, 293 pp. (Outlines of Industrial Chemistry.) *Reprinting*

CONTENTS: General Chemical Principles; Weight and Volume of Air Required for Combustion; Analysis of Fuel and Fuel Gases; Calorimetry and Determination of the Heating Value of a Fuel; Measurement of High Temperatures; Pyrometry; Calculation of Combustion Temperatures; Natural Solid Fuels; Artificial Solid Fuels; Gaseous Fuel; Manufacture of Producer Gas and Water Gas; Theory of the

Producer Gas and Water Gas Reactions; Explosion and Explosion Engines; Air Supply and Measurement of Draught; Furnace Efficiency and Fuel Economy; Heat Balances, Furnace and Boiler Tests; Liquid Fuels; Appendices.

ELLIS, CARLETON, and MEIGS, JOSEPH V. Gasolene and Other Motor Fuels. *In Press*

This book will be very complete and extensive, and will interest the members of the petroleum industry, the natural gas industry, the coke oven industries, the illuminating gas and associate industries, the alcohol industry, and the manufacturer of automobiles.

HERINGTON, C. F. Powdered Coal as a Fuel. *New Edition in Press*

CONTENTS: Introduction; Coals Suitable for Powdering Preparation of Powdered Coal; Feeding and Burning Powdered Coal; Powdered Coal in the Cement Industry; Application of Powdered Coal to Reverberatory Furnaces; Powdered Coal in Metallurgical Furnaces; Powdered Coal Under Boilers; Powdered Coal for Locomotives; Explosions; Bibliography.

This book, written for the engineers, superintendents and owners of plants, explains how the greatest efficiency can be obtained from the use of coal by powdering. Many examples of plants in operation are given in detail, together with sound and conservative analysis of results. A great deal of information on the very live subject is contained in the author's description of current practice, and special attention is given to such questions as the grade of coal to use, costs and proper applications. The illustrations are plentiful, well selected, and carefully executed, so that the reader will find them very helpful.

KERSHAW, JOHN B. C. Fuel, Water and Gas Analysis For Steam Users. *Second Edition, Revised and Enlarged.* Ill., 6 x 9, 213 pp. *In Press*

CONTENTS: *Fuel.* Natural and Artificial Fuels, Their Origin, Composition and Methods of Sampling; The Approximate Analysis of Fuel; Preparing the Sample, Testing the Fuel; The Calorific Valuation of Solid Fuels; The Calorific Valuation of Liquid and Gaseous Fuels; The Practical Applications of the Test Results. *Water.* The Sources of Feed Water Supply and the Physical and Chemical Characteristics of the Same; The Approximate Analysis of Water; The Practical Applications of the Test Results; The Use of Softening Reagents and the Tests Necessary to Regulate Their Amount. *Waste Gases.* The Chemical and Physical Characteristics of the Waste Gases—Sampling the Gases; The Approximate Analysis of the Water Gases; The Use of Continuous and Recording Gas-Testing Apparatus; The Practical Applications of the Gas-Test Results; Appendix.

LEWES, V. B. Liquid and Gaseous Fuels and the Part They Play in Modern Power Production. Ill., 5¾ x 8½, 348 pp. (Van Nostrand's Westminster Series.) **\$3.00**

CONTENTS: Combustion; Formation and Composition of Fuel; Determination of Calorific Value; Liquid Fuels; Use of Liquid Fuels; Liquid and Gaseous Fuels; Manufacture of Coal Gas; Use of Coal Gas for Heating and Power; Water Gas; Poor Fuel Gas; The Fuel of the Future.

MOORE, HAROLD. Liquid Fuels for Internal Combustion Engines. A practical treatise for engineers and chemists. 48 illustrations. 5½ x 8¾, 215 pp. **\$5.00**

CONTENTS: Petroleum; Shale Oil and Its Products; Coal Tars and Their Products; Lignite Tars and Their Products; Production of the Carbonisation of Wood and Peat; Animal and Vegetable Oils; Methyl and Ethyl Alcohol; Fuels for Engines Fitted with Carburetters; Fuels for Engines Fitted with Vaporisers; Fuel Oils for Engines Fitted with Atomisers; The Examination of Liquid Fuels; Calorimetry.

POPPLEWELL, W. H. Prevention of Smoke, Combined with the Economical Combustion of Fuel. 50 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 220 pp. **\$3.50**

CONTENTS: Fuels and Combustion; Hand; Firing in Boiler Furnaces; Mechanical Stroking; Powdered Fuel Firing; Gaseous Fuel; Testing of Boilers; Smoke Observations; Standard Smoke Tests; Legal Aspect of the Smoke Question; Means for Lessening Smoke.

SEXTON, A. H. Fuel and Refractory Materials. *Third Edition, Revised.* 104 ill., $5 \times 7\frac{1}{2}$, 374 pp. *Reprinting*

CONTENTS: Combustion. Heating Power of Fuels. Fuels. Wood, Peat, Coal. Solid Prepared Fuels. Charcoal, Peat-charcoal, Coke. Coal Washing. Liquid Fuels. Gaseous Fuels. Recovery of By-products. Furnaces for Metallurgical Purposes. Supply of Air to the Furnace. Removal of Waste Products. Smoke. Smoke Prevention. Pyrometry. Calorimetry. Utilization of Fuel. Testing Fuels. Refractory Materials. Bricks. Crucibles. Notes and Tables.

PRODUCER GAS

ALLEN, H. Modern Power Gas Producer Practice and Applications. A practical treatise dealing with the gasification of various classes of fuel by the pressure and suction systems of producer. 136 ill., $5\frac{1}{2} \times 7\frac{1}{2}$, 344 pp. *Reprinting*

CONTENTS: Natural Gas in England; Manufactured Gas; Chemistry of Manufacture and Combustion of Power Gas; Specific Heat; Calculating the Volume of Gas Produced from Fuel; Coal; Gasification of Fuel; Gas Producers, Pressure Type; Recent Improvements in Gas Producers; Suction Gas Producers; Successful Operation of; Application of; Power Gas Installations; Application of Gaseous Fuel to Internal Combustion Engines; Thermal Power, Flame Temperature, and Explosion Pressures of Combustible Gases; Proportions of Pipes in Gas Plants; Gas Analysis; Examination of Various Classes of Fuels; Their Thermal Value; Thermal Value of Combustible Gases; Dangers in Manufacture of Power Gas; Testing Gas Producers; Patents; Appendix.

LATTA, NISBET. American Producer Gas Practice and Industrial Gas Engineering. 247 ill., $7\frac{3}{4} \times 10\frac{3}{4}$, 547 pp. **\$6.00**

CONTENTS: Producer Operation; The Producer; Cleaning the Gas; Works Details; Producer Types; Moving Gases; Solid Fuels; Physical Properties of Gases; Chemical Properties of Gases; Gas Analysis; Gas Power; Gas Engines; Furnaces and Kilns; Burning Lime and Cement; Preheating Air; Doherty Combustion Economizer; Combustion in Furnaces; Temperature, Radiation and Conduction; Data; Heat Measurement; Flues and Chimneys; Materials; Useful Tables; Glossary.

A manual in simple language, of producer gas engineering practice, as applied to everyday operations upon a practical and commercial basis, omitting any theorizing and laboratory results unsuitable to commercial and manufacturing conditions, Readable alike to the engineer, operator and promoter.

WATER

CHRISTIE, WILLIAM W. Water, Its Purification and Use in the Industries. 79 ill., 3 folding plates, 2 colored inserts, $5\frac{1}{2} \times 8$, 230 pp. **\$2.00**

CONTENTS: Sources of Water. Impurities; Uses, Reagents. Water Softening: Cold Process Systems; Hot Process Systems. Results Accomplished by Softening Systems. Pressure Filters. Aeration. Sterilization. Ozone. Ice. Drinking Water.

Open Filters. Alum. Chloride of Lime. Tannin. Measurement of Water. Oil Filters. Boiler Water. Miscellaneous Tables.

Contains general information regarding water together with tables of value to users of water for manufacturing and industrial purposes, so written as to present the technical aspect of the subject, describing the various machines and apparatus without referring to them by their makers' names. It is believed that this work, for the first time, brings together much scattered information on the subject of water purification, especially the mechanical part, some of which was entirely unavailable. The methods of and materials for chemical treatment of water are given prominence.

COLES-FINCH, W. *Water, Its Origin and Use.* Fully illustrated, $5\frac{3}{4} \times 8\frac{1}{4}$, 540 pp. **\$5.00**

CONTENTS: Heat. Atmosphere. Clouds. Rain, Water. Forms of Water, Snow. Ice. Glaciers. Springs. Rivers. Waterfalls. Lakes. Ocean and Sea. Mountains and Volcanoes. Chalk. Denudation. Water, How Obtained. Use. Abuse and Waste of Water. Lessons from Nature.

The scientific side of the subject, though not unduly emphasized, is not lost sight of in this work, which combines the sciences of heat, hydrostatics and physical geography. It tells in a popular manner of the various forms under which water is present in the solar system, the laws governing these changes of form and the uses man has made of it, so that it reads as interestingly as a novel. The volume is illustrated most lavishly largely by excellent reproductions of photographs by Mrs. Aubrey le Blond of Alpine phenomena associated with water.

COWELL, W. B. *Pure Air, Ozone and Water.* A practical treatise of their utilization and value in oil, grease, soap, paint, glue and other industries. Ill., $5 \times 7\frac{1}{2}$, 91 pp. **\$2.50**

CONTENTS: Atmospheric Air; Compressed Air; Liquid Air; Purification of Water; Fleshings and Bones; Ozonized Air in the Bleaching and Deodorizing of Fats, Glues, etc.; General Information.

DE LA COUX, H. *The Industrial Uses of Water.* Translated from the French and revised by Arthur Morris. 132 ill., $6\frac{1}{4} \times 10$, 362 pp. **\$5.00**

CONTENTS: Water, Its Chemical Action and Composition; Effects of Water in the Industries; Difficulties with Water; Appropriate Remedies; Preliminary Treatment and Apparatus; Residuary Waters and Their Purification; Qualitative, Quantitative and Hydrotimetric Analysis.

WANKLYN, J. A. *Water Analysis.* A practical treatise on the examination of potable water. *Eleventh Edition.* Revised by W. J. Cooper. Ill., $5 \times 7\frac{1}{4}$, 240 pp. **\$2.00**

POWER AND POWER TRANSMISSION

BALL, R. S. *Natural Sources of Power.* 104 ill., $6 \times 8\frac{1}{2}$, 364 pp. (Van Nostrand's Westminster Series.) **\$2.50**

CONTENTS: Units with Metric Equivalents and Abbreviations; Introductory Water Power and Methods of Measuring; Application of Water Power to the Propulsion of Machinery; The Hydraulic Turbine; Various Types of Turbine; Construction of Water-Power Plants; Water-Power Installations; The Regulation of Turbines; Wind Pressure; Velocity and Methods of Measuring; The Application of Wind Power to Industry; Modern Windmills; Constructional Details; Power of Modern Windmills; Appendices.

CHRISTIE, W. W. *Chimney Design and Theory.* A book for engineers and architects. *Second Edition, Revised and Enlarged.* Ill., $6\frac{1}{4} \times 9$, 200 pp. **\$3.00**

CONTENTS: Theory of Chimney Draft; Formulas; Tables; Wind Pressure;

Air-space in Grates; Foundation Materials; Brick Chimney Materials; Steel Chimneys, Their Theory, Examples of Existing Structures; Chimney Performances; Special Types; Straightening Chimneys; Flues; House Chimneys; Lightning Protection; General Information.

SVENSEN, CARL L. *A Handbook on Piping.* 359 ill., 8 folding plates, 6¼ x 9¼, 367 pp. **\$4.00**

CONTENTS: Pipe; Dimensions and Strength of Pipe; Pipe Threads; Pipe Fittings; Pipe Joints; Standard Valves; Special Valves; Steam Piping; Drip and Blow-Off Piping; Exhaust Piping and Condensers; Feed Water Heaters; Piping for Heating Systems; Water and Hydraulic Piping; Compressed Air, Gas and Oil Piping; Erection Workmanship; Miscellaneous; Piping Insulation; Piping Drawings; Specifications; List of Books and References; Appendix.

This work is offered for the purpose of supplying in convenient form information and data regarding piping, fittings, pipe joints, valves, pipe drawings, and pipe lines and their accessories. The variety and extent of tables, illustrations and formulæ will be sufficient to make it of value to both engineers and students.

TRINKS, W. *Governors and the Governing of Prime Movers.* 140 ill., 6 x 9¼, 254 pp. **\$3.50**

CONTENTS: Introduction; General Statements; The Direct-Control Governor as a Motor; Promptness and Traversing Time; Adjustment of Equilibrium Speed; Shaft Governors; Natural Period of Vibration of Governors; Effects of Outside Forces Impressed upon Governors; Interaction Between Governor and Prime Mover; Discarded Types of Speed Governors; Rate-of-Flow Governors; Pressure Governors; Relay Governing; Governor Troubles and Their Remedies; Self-Regulating Features of Prime Movers; Appendix.

This volume, giving the essentials and principles of governors and the properties of prime movers with regard to regulations, fills a gap in our engineering literature, being the only book of any consequence on its subject. The essentials are so presented as to be within the grasp of undergraduates as well as practicing engineers. The lucid presentation of the essentials will assist engineers to keep apace with the changing practice and put them in a position to judge existing and future types of governors, as well as the properties of prime movers that effect regulation. Every drawing was especially made for this book, and shows diagrammatically the important features that the reader should be familiar with.

WALLIS-TAYLER, A. J. *Bearings and Lubrication.* A handbook for every user of machinery. 75 ill., 6 x 9, 216 pp. **\$1.50**

CONTENTS: Friction; Bearings; Stuffing Boxes and Packings; Lubrication; Action of Oils on Metals; Determination of the Lubricating Value of Oils; Adulteration of Oils; Lubricators; General Observations; Storage of Oil; Oil Cans.

STEAM ENGINES

BARKER, A. H. *Graphic Methods of Engine Design.* Including a graphical treatment of the balancing of engines. *Second Edition.* 90 ill., 5 x 7½, 217 pp. **\$2.00**

CONTENTS: Size of Engine for Given Power; Valves; Ports; Valve Diagrams; Dimensions of Details; Compounding; Compound Diagrams; Flywheels; Theory of Inertia of Moving Parts; Inertia Diagrams; The Motion of the Connecting Rod; Balancing; Force Curves; Methods of Force Balancing; The Theory of Couples; Inertia Couples on an Engine; Balancing of Two-Cylinder Engines with Cranks at Right Angles; General Remarks on Balancing.

GOODEVE, T. M. *Textbook on the Steam-Engine.* With a supplement on Gas Engines, and Part II. on Heat Engines. *Fifteenth Edition.* 187 ill., 5¼ x 7½, 416 pp. **\$3.50**

GOULD, E. S. *The Arithmetic of the Steam Engine.* Ill., $5\frac{1}{2} \times 8\frac{1}{4}$, 80 pp. **\$1.00**

CONTENTS: Heat; Absolute Zero; Ice; Steam; Pressure and Volume; Combustion and Combustibles; Steam Used Expansively; Back Pressure; Mean effective Pressure; Clearance; Horse Power; Indicator Diagrams; Compound Engine; Work; Falling Bodies; Tables of Properties of Saturated Steam; Hyperbolic Logarithms.

HECK, ROBERT C. H. *The Steam Engine and Turbine.* A textbook for engineering students. 400 ill., 6×9 , 625 pp. **\$4.50**

CONTENTS: Introductory; Elementary Theory of the Heat Engine; Properties and Behavior of Steam; Ideal Steam Cycles, for Engine and for Turbine; Action of the Steam in the Engine; Performance and Efficiency of the Engine; Working and Construction of the Engine; Valve Gears and Governors; Action of the Steam in the Turbine; Sundry Steam Tables. *Appendix:* Tables and Diagrams of the Properties of Steam.

Essentially a text-book, intended to be studied and taught, emphasizing the scientific side of the subject, and founded upon the idea that what the student needs is a thorough grounding in principles, with a general knowledge of construction and of the questions underlying economy in operation. It is designed to fill a place in a well-developed course, and does not aim to cover the whole field of steam-power engineering, but should be supplemented by laboratory work and instruction, by visits of inspection, and by the course in machine design. No attempt is made to supply the knowledge of detail and of expedient and the skill in operation that can be acquired only by experience and practice.

HECK, R. C. H. *The Steam Engine and Other Steam Motors.* A text-book for engineering colleges and a treatise for engineers. In two volumes. $6\frac{1}{4} \times 9\frac{1}{2}$, cloth.

Vol. I. *The Thermodynamics and the Mechanics of the Engine. Second Edition, Revised.* 187 ill., 400 pp. **\$4.50**

CONTENTS: General View of the Subject; Elementary Thermodynamics of Heat-Engine; Theory of Steam Engine; Action of Steam in the Engine; Dynamics of Steam; Entropy; Temperature Diagram; Mechanics of the Engine; Tables on Superheated Steam.

Vol. II. *Form, Construction, and Working of the Engine: The Steam Turbine.* 698 ill., 686 pp. **\$5.50**

CONTENTS: Form and Construction of the Engine; Valve Gears and Their Action; Governors or Regulators; Steam Action in the Multiple Expansion Engine; Steam Turbine; Steam Engine Performance; Tables.

KLEIN, J. F. *Design of a High Speed Steam Engine. Second Edition, Revised and Enlarged.* 140 ill., $6\frac{1}{2} \times 9\frac{1}{4}$, 257 pp. **\$5.00**

CONTENTS: Shows a Graphical Method for Determining the Principal Dimensions of a High-Speed Steam Engine by Figuring Out the Following: Effective Steam Pressures; Connecting Rod and Crank Lengths; Mean Accelerating Force Necessary to Start Reciprocating Parts, Diameter of Cylinder; Length of Stroke; Revolutions Per Minute; Reciprocating Parts; Belt Pulley; Crank Shaft; Steam Ports and Pipes; Cylinder Walls; Valve Gears; Valve Diagrams; Link Motions, etc.

LALLIER, ERNEST V. *An Elementary Manual of the Steam Engine.* Containing also a chapter on the theory, construction and operation of internal combustion engines. For the operating engineer. 102 ill., $6 \times 8\frac{1}{2}$, 274 pp. **\$2.00**

(Author is instructor in engineering at the Hebrew Technical Institute, New York.)

CONTENTS: Reciprocating Steam Engines. Action of the Eccentric. The

Governor. Engine Calculations. The Piston. Work done by Steam during Formation. The Expansive Working of Steam. The Indicator. Description of Indicator. Heat. Boilers. Fire-tube Boilers. Calculation for Tubular Boilers. Water-tube Boiler Pumps. Corliss Engine. Pipes and Fittings. Rotary Engines. Internal Combustion Engines. Lubrication.

Written with a view to presenting the fundamental principles of the use of steam and steam engines in an elementary manner, so as to be useful to students of steam engineering who, while possessing excellent training in mathematics and general science, are yet so immature as to be unable readily to make practical application of their general knowledge; and the average operating man, who despite his experience realizes his lack of an adequate grasp of fundamental principles. The advancement of both of these classes is seriously hampered, and this new work aims to teach the subject so that each may be able to supplement his partial knowledge.

RANKINE, W. J. M. **A Manual of the Steam Engine and Other Prime Movers.** *Seventeenth Edition, Revised*, by W. J. Millar, with a section on Gas, Oil and Air Engines by Bryan Donkin. Ill., 6 x 8, 672 pp. **\$6.00**

CONTENTS: Machines in General; *Muscular Power*; General Principles; Power of Men; Power of Horses and Other Beasts; *Water and Wind Power*; Sources of Water for Power; Water Power Engines in General; Water Bucket Engines; Water Pressure Engines; Vertical Water Wheels; Turbines; Fluid on Fluid Impulse Engines; Windmills; *Steam and Other Heat Engines*; Heat: Combustion and Fuel; Thermo-dynamics; Furnaces and Boilers; Mechanism of Steam Engines; *Electromagnetic Engines*; *Gas, Oil and Air Engines*.

RICHARDSON, J. **The Modern Steam Engine; Theory, Design, Construction, Use.** A practical treatise. 293 ill., 6 x 9, 396 pp. **\$3.50**

CONTENTS: Unit of Power; Natural Forces; Early Types of Engine; The Watt Engine; Use of Steam in Multiple Cylinder or Compound Engines; Valve Gears; Double or Compound Slide Valves; Releasing Valve Gear; Exhaust Valves and Valve Driving Gear; The Governor; Electrical Regulation Condensers; The Steam Turbine; Design of Details; Examples of Various Types; Feed and Steam Heating; Hints to Users.

ROSE, J. **Key to Engines and Engine Running.** A practical treatise upon the management of steam-engines and boilers for the use of those who desire to pass an examination to take charge of an engine or boiler. Ill., $5\frac{3}{4}$ x 8, 417 pp. **\$2.50**

CONTENTS: Care, Management and Inspection of Boilers for Stationary Engines; The Steam Engine and its Accessories; Starting a Slide Valve Engine; Valve Gear; High-Speed Engines; Link Motion; Locomotive Running; Care and Management of Marine Engines; Condensing Engines; Various Kinds of Engines; Pumps; Injectors; Engineers Calculations; Mechanical Forces; Horse Power; Water; Heat; Steam; Steam Engine Indicators and Indicator Diagrams.

WATSON, E. P. **Small Engines and Boilers.** A manual of concise and specific directions for the construction of small steam engines and boilers of modern types from five horse-power down to model sizes. 35 ill., $5\frac{1}{2}$ x $8\frac{1}{4}$, 126 pp. **\$1.25**

CONTENTS: Illustration of Vertical Engine; Drawings; Examples of Skeleton Drawings; Plans for Vertical Engine Cylinder; How to do Work; Engine Details; Link Motion and How to Construct it; Bed Plate; Plans for Valve Stem, Stuffing Box and Connecting Rod; Building a Horizontal Engine; Setting Eccentrics; Plans for Small Powered Boilers.

SLIDE VALVES

AUCHINCLOSS, W. S. The Practical Application of the Slide Valve and Link Motion to Stationary, Portable, Locomotive, and Marine Engines. With new and simple methods for proportioning the parts. *Fifteenth Edition, Revised.* 52 ill., 6 x 9, 144 pp. **\$2.00**

CONTENTS: The Slide Valve; Elementary Principles and General Proportions; Short-Hand Method for Valve Proportions; General Proportions Modified by Crank and Piston Connections; Link Motions; Independent Cut-off; Clearance; Reduction in Travel; Link and Reciprocating Motion Combined; Travel Scale.

BEGTRUP, J. The Slide Valve and Its Functions. With special reference to modern practice in the United States. *Second Edition.* 90 ill., 6¼ x 9, 145 pp. **\$2.00**

CONTENTS: The Common Slide-Valve; Improved Slide-Valves; Four-Valve Systems; Independent Cut-off; The Slide-Valve on Pumps; Angularity of Connecting Rod and Eccentric Rod.

HALSEY, F. A. Slide Valve Gears. An explanation of the action and construction of plain and cut-off slide valves. *Twelfth Edition, Revised and Enlarged.* 109 ill., 5¼ x 7½, 213 pp. **\$1.50**

CONTENTS: The Slide Valve with Fixed Eccentric; The Slide Valve with Shifting and Swinging Eccentric; The Slide Valve with Independent Cut-off; The Slide Valve with Link Motion.

YOUNGSON, PETER. Slide Valves and Valve Gearing. 115 ill., 10 folding plates, 7 x 10, 194 pp. **\$3.00**

This work has been specially written for marine engineers. It is intended to illustrate the working and management of marine valve gear in as simple and complete a manner as possible, and sea going engineers will find it very useful.

INDICATORS

PULLEN, W. W. F. Indicator Diagrams. 261 ill., 5½ x 8¾, 242 pp. **\$3.00**

CONTENTS: Measurement of Power with the Indicator; Indicator Rigs; Reducing Gears; Types of Indicators; Calibrating Indicator Springs; Errors in the Indicator Diagram; Preliminary Analysis of the Diagram; Diagrams Showing Variation of Load; The Admission and Steam Lines of the Indicator Diagram; The Exhaust and Compression Lines; Valve Chest and Steam Pipe Diagrams; Adjustment of the Slide Valve; Pump Diagrams; Miscellaneous Diagrams; Averaging Diagrams; Mechanical Efficiency; Tables, &c., &c.

BOILERS

BATEY, JOHN. Steam Boilers and Combustion. 18 ill., 4¾ x 7½, 220 pp. **\$2.00**

CONTENTS: Combustion and Steam Production; Information in Regard to Boilers and Production of Steam; Water and Steam; Steam Boilers; Vertical Boilers; Marine, or Scotch Boiler; Water-Tube Boilers; Steam Boiler Practice; Combustion; Hydrocarbons, Radiant and Convected Heat, Distillation, etc.; Temperature; Lessons Taught by Experiments; Philadelphia Exhibition Tests; Normal Results Obtained by Abnormal Methods; Analysis of Actual Performance of Locomotive Boiler; Movement of Gases Through Tubes.

BOOTH, WILLIAM H. *Water Softening and Treatment.* 92 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 308 pp. Reprinting

CONTENTS: *The Treatment of Water by Softening, Oil Separation and Filtration.* Natural Waters; Water, Its Sources and Impurities; Salts in Water; Reactions of Salts in Solution; The Less Usual Reagents; Scale and Its Effects; Water Analysis; Apparatus in Commercial Use; Detartarizers; Filters; Boiler Compounds; Corrosion; Incrustation of Pipes; Oil Separation; Mechanical Boiler Cleaners; Pure Water. *Air Pumps, Condensers, and Circulating Pumps. Feed Heating-Stage Heating. Water Cooling. Feed Pumps, Injectors.*

CHRISTIE, W. W. *Boiler-waters, Scale, Corrosion, Foaming.* 77 ill., $6\frac{1}{2} \times 9\frac{1}{4}$, 242 pp. \$3.00

CONTENTS: Water, Its Properties; Materials Found in Water; Water Analysis; Boiler; Scale; Transmission of Heat; Conductivity of Solids; Corrosion; Feed-Water Pipes; Blow-Off Pipes; Tubes; Priming and Foaming; Oil; Grease; Zinc; Hardness of Water; Feed-Water Heaters; Economizers; Water-softening; Tables.

PRATT, H. K. *Boiler Draught.* Ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 205 pp. \$1.25

CONTENTS: Draught; Calculations Relating to Air; Chimneys; Construction; Artificial Draught; Forced; Induced; A Comparison; Application of Mechanical Draught for Land Installation and Marine Practice; Chemistry of Combustion. A description of the various methods and systems in use in England to maintain the most efficient condition of boiler draught, together with other information that bears on the subject.

PULL, ERNEST. *Modern Steam Boilers, Their Construction, Management and Use.* A practical handbook for marine and general engineers, steam users, and students in engineering colleges and technical institutes. 195 ill., 5 folding plates, $5\frac{1}{2} \times 8\frac{1}{2}$, 295 pp. \$5.00

CONTENTS: Temperature and Heat; Steam Generation; Fuel and Its Combustion; Boiler Materials; Boiler Construction; Flue, Smoke Tube, and Mixed Types of Horizontal Boiler; Vertical Boilers; Water-Tube Boilers; Boiler Mountings; Boiler Feed Water; Boiler Draught; The Management of Steam Boilers.

PULLEN, W. W. F. *Injectors: Theory, Construction and Working.* *Third Edition.* 148 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 214 pp. \$2.00

CONTENTS: The Injector; Construction and Arrangement of Simple High Pressure Injectors; Construction and Arrangement of High-Pressure Compound Injectors; Injector Calculations for Simple High-Pressure Types; The Steam Jet; High-Pressure Compound Injectors; Exhaust Injectors; The Exhaust Injector; The Ejector Condenser; The Water Injector; Air Injectors; Air Ejectors; Historical Summary.

RIMMER, E. J. *Boiler Explosions, Collapses and Mishaps.* With an introduction by A. A. Hudson. Ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 151 pp. \$2.25

CONTENTS: Legislation in Regard to Boilers and Boiler Explosions; Formal Investigations and Findings of Commissioners as to Negligence; Cause and Prevention of Explosions (with reference to Board of Trade Reports); Evidence of Causes of Explosions; Appendices.

A summary of the causes of boiler explosions and the recommendations for their prevention contained in the Reports of the Board of Trade from 1882 to 1911, together with a statement of the statutory duties of steam users and their liabilities as defined by the commissioners holding investigations under the boiler explosions acts.

ROWAN, F. J. *The Practical Physics of the Modern Steam Boiler.* Preface by Prof. R. H. Thurston. Ill., $6\frac{1}{4} \times 8\frac{3}{4}$, 669 pp. \$3.00

CONTENTS: General Considerations; Fundamental Elements of Boiler Design; Combustion; Transmission of Heat; Circulation of Water; Effects of Temperature on Tenacity and Ductility; Corrosion and Incrustation; Historical Sketch of Boiler Design; Boiler Tests and Results.

STEAM TURBINES

See also "Marine Engines."

STODOLA, A. *Steam Turbines.* *Second Revised Edition* of the authorized translation from the second revised German edition by L. C. Loewenstein. 241 ill., 3 lithographed tables, $6\frac{1}{2} \times 9\frac{1}{2}$, cloth, 509 pp. **\$5.00**

CONTENTS: Elementary Theory of the Steam Turbine; Axial Turbines; Radial Turbines; Theory of the Steam Turbine Thermo-dynamically Considered; Steady Flow of Steam; Conversion of Energy in the Steam Turbine; Construction of Most Important Turbine Parts; Critical Angular Velocity of a Multiple Loaded Shaft; Steam Turbine Parts; A Few Special Problems of Steam Turbine Theory and Construction; Future of the Heat Engine; Mathematical Derivations of Difficult Formulas in Text.

WILDA, H. *Steam Turbines.* Their theory and construction. Translated from the German by Chas. Salter and revised and adapted to English practice. 104 ill., $5 \times 7\frac{1}{2}$, 203 pp. **\$2.00**

CONTENTS: Introduction and Properties of Steam. Flow of Steam. Classification of Steam Turbines According to Arrangement of Vanes. The Flow of Steam through the Steam Turbine. Details of Steam Turbines. General Arrangement of Various Turbines in Practice. Condensers. Utilisation of Exhaust Steam. Practical Application of Steam Turbines.

STEAM AND STEAM TABLES

BOOTH, W. H. *Superheaters, Superheating, and Their Control.* Ill., 6×9 , 170 pp. **\$1.50**

CONTENTS: History; Specific Heat of Materials; Action of Steam; Steam; Superheated Steam; Steam Pipes and Valves; Superheat and Steam Turbines; Behavior of Engines with Superheated Steam; Controllable Superheaters; Feed Water Heating; Examples of Superheaters; Economy; Superheat in Locomotives; High Superheat; Useful Hints; Tables.

GOLDING, H. A. *The Theta-Phi Diagram.* Practically applied to steam, gas, oil and air engines. *Second Edition, Revised and Enlarged.* Ill., $5 \times 7\frac{1}{2}$, 134 pp. **\$2.00**

CONTENTS: Entropy; Entropy of Water and Steam; Conversion of Indicator Diagram to Entropy Diagram; Heat Losses; Application to the Gas Engine; Application to Oil and Air Engines.

HALL, H. R. *Governors and Governing Mechanism.* *Second Edition, Enlarged.* Isochronous Governor; Qualifications a Governor Should Possess; Power and Sensitiveness, Regularity, Steadiness and Lightness; Governor Gear; Throttle *larged.* 120 ill., $5 \times 7\frac{1}{4}$, 188 pp. **\$2.50**

CONTENTS: The Conical Pendulum; Centrifugal Force; Watt's Governor; The Valve Gear; "Automatic" Slide Valve Gear; Trip Valve Gear; Crank-Shaft Governor; Inertia Governor; Gas Engine Governors; Relay Governors; Governor Governor Power; Various Makes of Governors and Governing Mechanism. Springs; Petrol Car Governor; Detailed Example of Design; Corliss Gears;

SMITH, C. A. M., and WARREN, A. G. *The New Steam Tables.* Together with their derivation and application. With an introduction by Sir J.

Alfred Ewing. $5\frac{3}{4} \times 8\frac{3}{4}$, 114 pp. **\$1.25**

CONTENTS: INTRODUCTION. DERIVATION AND APPLICATION. CENTIGRADE UNITS. Properties of Saturated Steam on Pressure Base. Pound Centigrade Units. Properties of Saturated Steam on Centigrade Temperature Base. Specific Heats of Superheated Steam at Various Temperatures. Centigrade and Pressures. Average Specific Heats of Superheated Steam from Saturation to Tabulated Temperatures. Centigrade. At Various Pressures. FAHRENHEIT UNITS. (Same Tables as for Centigrade Units) Logarithms and Antilogarithms. Mollier Chart (in Cover Pocket).

STEWART, G. Modern Steam Traps (English and American). Their construction and working. 71 ill., $5 \times 7\frac{1}{2}$, 112 pp. **\$1.75**

CONTENTS: Expansion Steam Traps; Float-Operated Steam Traps; Bucket-Type Steam Traps; Thermostatic Steam Traps; A Differential Water-Pressure Steam Trap; Return-Feed Systems; The Bundy Steam Trap; Automatic Valves of the Atmospheric Steam Heating Co.

POWER PLANT TESTING

BARRUS, G. H. Engine Tests. Embracing the results of over one hundred feed-water tests and other investigations of various kinds of steam-engines, conducted by the author. Ill., $6\frac{3}{4} \times 9\frac{1}{2}$, 338 pp. **\$4.00**

JERVIS-SMITH, FREDERICK J. Dynamometers. Edited and amplified by Charles Vernon Boys, F.R.S. 117 ill., 6×9 , 271 pp. **\$4.00**

CONTENTS: Introductory; Friction; Planimeters; Friction Brakes; Water Brakes; Air Brakes; Magnetic Brake Dynamometer; End Thrust Brakes; Historical; Transmission Dynamometers; Torsion Power-Measuring Machines; Torsion Power-Measuring Machines of Different Inventors; The Cradle Dynamometer; Dynamometric Tests of Motor Car Engines; Model Ship Dynamometer; Dynamometers Used in Aeronautics.

An historical work describing in detail the machines which, from time to time, have been invented for estimating the output of prime movers and the power absorbed by machines when driven by engines or motors. The author spent considerable time investigating the subject, and himself an inventor of some repute never completed his book, but the work was finished by Mr. Boys, who added considerable new matter.

PULLEN, W. W. F. Testing of Engines, Boilers and Auxiliary Apparatus. *Second Edition.* 733 ill., $5\frac{1}{2} \times 8\frac{3}{4}$, 746 pp. **\$5.50**

CONTENTS: Tables and Other Data; Mechanical Aids to Calculation; Measurement of Pressure; Measurement of Temperature; Measurement of Speed; Measurement of Power Output; Measurement of Power Input with Dynamometer; Diagram; Other Features of Steam Engine Diagrams; The Adjustment of the Hints on the Management of Indicators; Analysis of the Steam Engine Indicator Measurement of Power Input with Indicator; Indicator Rigs and Accessories; Slide Valve; Internal-combustion Engine Diagrams; Testing Indicator Springs; Measurement of the Quality of Steam; Measurement of Quantity of Steam and Water; The Testing of Steam Engines; Fuel Testing; The Analysis of Flue Gases; Boiler Testing; The Testing of Auxiliary Machinery; The Testing of Internal-combustion Engines.

SMALLWOOD, JULIAN C. Mechanical Laboratory Methods. The testing of instruments and machines in the mechanical engineering laboratory and in practice. *Second Edition, Revised and Enlarged.* 114 ill., $5 \times 7\frac{1}{2}$, flexible fabrikoid, 417 pp. (Van Nostrand's Textbooks.) **\$3.00**

CONTENTS: Principles of Measurements. *Testing of Instruments.* Scales and Pressure Gages; Angular Velocity Meters; Dynamometers; The Engine Indicator; Planimeters; Flow Meters; Pyrometers; Steam Calorimeters; Friction Testers. *The Analysis of Combustion.* Proximate Analysis; Heat Value of Fuels; Exhaust Gas Analysis. *The Testing of Power Plant Units.* Steam Engine Testing; Steam Pump Testing; Boiler Testing; Testing of Steam Auxiliaries; Gas Engine Testing; Gas Producer Testing; Refrigeration Machinery Testing; Testing of Air Machinery; Testing of Water Motors. *Miscellaneous Tests.* *Appendix.* Useful Tables and Diagrams.

For this new edition the work has been enlarged and modified, numerical work has been checked, and defects eliminated. A new section on the testing of refrigerating machinery, absorption and compression systems will be found of value. Sufficient tabular matter is appended to enable the user of the book to calculate all the results sought by the various tests.

TENNEY, EDWARD H. *Test Methods for Steam Power Plants.* A reference book for the use of power station engineers, superintendents and chemists. 85 ill., 39 tabs, $5\frac{1}{4} \times 7\frac{1}{2}$, flexible fabrikoid, 224 pp. (Van Nostrand's extbooks.) **\$3.00**

CONTENTS: Purchase and Testing of Coal; Investigation of the Economy of Combustion; Treating and Testing Waters for Boiler-feed Purposes; Evaporative Tests for Capacity and Efficiency; Methods of Testing Prime Movers; Testing of Power Plant Lubricants.

Brings together into one volume those methods of analysis which can be used to good advantage in the power plant, and which will aid the power station engineer in keeping costs of generation at the lowest figure.

LOCOMOTIVES.

GIBBINGS, ALFRED H. *Oil Fuel Equipment for Locomotives and Principles of Application.* *Reprinting*

CONTENTS: Preliminary Observations and Data; Advantages of Oil Fuel; Principles of Combustion; Methods of Burning Oil Fuel: Different Systems; Steam-jet System, Air-jet System; Pressure-jet System; Pressure-jet Systems—Comparative Tests; Burners; Firebox Conditions and Dampers; Draught Regulation; Regulation of Oil Supply to Furnace; Evaporation Capacity and Heating Surface; Disposition of the Apparatus for Pressure-jet System; Oil Tanks; Piping; Firebricks and Fire Doors; Making Tests and Taking Records; Running Conditions; Instructions to Enginemen; Specification Clauses for Locomotive Oil-Burning Equipments; Auxiliary Apparatus; Holden's Injector and Steam Fitting for Locomotives; The Meyer-Smith Lighting-Up or Starting Heater; The Thermo-scope; The "Premier" Steam Trap; Conversion Table; List of Modern Publications and Papers on Oil Fuel, etc.; Reference.

YODER, J. H., and WHAREN, G. B. *Locomotive Valves and Valve Gears.*

With a special treatise on valve setting. An explanation of the construction and action of the plain slide valve, the piston valve and the gears which operate them, as applied to locomotives. Based on notes used in schools for apprentices, Pennsylvania Railroad. 274 ill., $6\frac{1}{2} \times 9\frac{1}{2}$, 277 pp. **\$3.00**

CONTENTS: Common D Slide Valve; Valve Events; Description of Slide Valve and Its Seat; Special Designs of Slide Valves; Balancing the Slide Valve; The Piston Valve; Piston Valve for Balanced Compound Locomotives; The Stephenson Valve Gear; Effects of Raising or Lowering the Link; The Walschaert Valve Gear; Construction and Development; Description of Parts; Operating Parts of the Gear; Relative Crank Pin and Piston Positions for Different Valve Events at Full Forward Gear; Relative Crank Pin and Positions for Different Valve Events at the Running Cut-Off Position; Distortions of the Walschaert

Valve Gear; Layout of Walschaert Gear; Baker Locomotive Valve Gear; The Young Locomotive Valve, Valve Gear and Reverse Gear; The Gooch Stationary Link; The Allen Valve Gear; Effects of Altering the Valve and Its Events; Locomotive Valve Setting; Stephenson Gear; Walschaert Gear; Rules for Valve Setting; Baker Locomotive Valve Gear; Summary; The Indicator Diagram and Its Application; Application of the Diagram; Horse Power of Locomotives; Tractive Force of Two-Cylinder Compound Locomotives; Tractive Force of Mallet Articulated Compound Locomotives; Classification of Locomotives.

This work is a special treatise on valves, valve gears, and valve setting which may be recommended to railway mechanics as a practical guide for locomotive valve setting and a treatise on the common and uncommon types of valve gears. It explains the construction and action of the plain slide valve, the piston valve, and the gears used to operate them, as applied to locomotives, and is based on notes used in the schools for apprentices on the Pennsylvania Railroad.

INTERNAL COMBUSTION ENGINES

BURSTALL, F. W. The Energy-Diagram for Gas. 27 x 37 folded to 7 x 10, 25 pp. With Text, \$1.50

Diagram mounted on linen sold separately. \$1.00

The object of the Energy-Diagram is to exhibit all the properties of the permanent gases in a convenient graphical form, when taking into account the fact of the variable specific heat. The diagram is analogous to the Mollier table diagram for steam, which enables all calculations in connection with the internal combustion engine to be made by simple measurements of length. It also enables the velocity of gases to be readily determined when they are discharging through nozzles. It is equally applicable to the gas, petrol, or Diesel motor, and upon it calculations can be made dealing with the obsolete cycles of Stirling and Ericsson.

CARPENTER, R. C., and DIEDERICH, H. Internal Combustion Engines.

Their theory, construction and operation. *Third Edition, Revised.*

379 ill., 6¼ x 9½, 612 pp. \$5.50

(Authors are professors of experimental engineering in Cornell University.)

CONTENTS: Definitions and Classification, Indicated and Brake Horse-Power; Thermodynamics of the Gas Engine; Theoretical Comparison of Various Types of Internal Combustion Engines; Various Events of the Constant-Volume and Constant-Pressure Cycle as Modified by Practical Conditions; The Temperature Entropy Diagram Applied to the Gas Engine; Combustion; Gas Engine Fuels, the Solid Fuels, Gas Producers; Liquid Fuels, Carbureters and Vaporizers; The Gas Fuels; The Fuel Mixture; Explosibility, Pressure and Temperature; History of the Gas Engine; Modern Types of Internal Combustion Engines; Gas Engine Auxiliaries: Ignition, Mufflers and Starting Apparatus; Regulation of Internal Combustion Engines; The Estimation of Power of Gas Engines; Method of Testing Internal Combustion Engines; The Performance of Gas Engines and Gas Producers; Cost of Installation and of Operation.

CHALKLEY, A. P. Diesel Engines for Land and Marine Work. With an introduction by Dr. Rudolf Diesel. *Fourth Edition, Revised and Greatly Enlarged.* 175 ill. and folding plates, 5½ x 8¾, 385 pp. \$4.00

CONTENTS: Expansion of Gases. Adiabatic Expansion. Isothermal Expansion. Working Cycles. Thermodynamic Cycles. Constant Temperature Cycle. Constant Volume Cycle. Constant Pressure Cycle. Diesel Engine Cycle. Reasons for the High Efficiency of the Diesel Engine. ACTION AND WORKING.—Four Cycle Engine. Two Cycle Engine. Two Cycle Double Acting Engine. Horizontal Engine. High Speed Vertical Engine. Relative Advantages of the Various Types of Engine. Limiting Power of Diesel Engines. Fuel for Diesel Engines. CONSTRUCTION.—Four Cycle Single Acting Engine; General Arrangement, Starting

and Running. Description of Four Cycle Engine. Valves and Cams. Regulation of the Engine. Types of Four Cycle Engines. High Speed Engine. Horizontal Engine. Two Cycle Engine. Air Compressors for Diesel Engines. Solid Injection Motors. INSTALLING AND RUNNING.—Space Occupied and General Dimensions. Starting up the Engine. Management of Diesel Engines. Cost of Operation of Diesel Engines. TESTING.—Object of Testing. Test on 200 B.H.P. Diesel Engine. Test on 300 B.H.P. High Speed Marine Engine. Test on 500 B.H.P. Engine. Test on High Speed Diesel Engine. DIESEL ENGINE FOR MARINE WORK, ADVANTAGES.—Design and Arrangement of Diesel Marine Engines. Methods of Reversing Diesel Engines. Auxiliaries for Diesel Ships. Horse Power of Marine Diesel Engines. Weights of Marine Diesel Engines. The Design of Large Engines. CONSTRUCTION.—Two-Cycle Engine. Swiss Type. Belgium Types. Swedish Type. German Types. British Types. Four-Cycle Engine. Dutch Type. German Types. Danish Type. Russian Types. Small Diesel Engines. DESIGN.—Cylinders and Cylinder Covers. Pistons. Cylinder Dimensions. Crank Shafts. Air Compressors. Scavenging Pumps. THE FUTURE OF THE DIESEL ENGINE.

CLARK, CARL H. *Marine Gas Engines, Their Construction and Management. Second Edition, Revised and Enlarged.* 102 ill., flexible fabrikoid, 138 pp. (Van Nostrand's Nautical Manuals.) **\$2.00**

CONTENTS: TYPES OF ENGINES: Principles of Operation of Each Type. Advantages of Each Type. TWO-CYCLE ENGINES: General Construction. Description of Some Standard Types. Pumps. FOUR-CYCLE ENGINES: General Construction. Description of Standard Types. VAPORIZERS AND CARBURETTERS: Vaporization of Fuel. Principles of Operation and Description of Standard Types. IGNITION DEVICES: Principles of Ignition. Mechanism of Igniters. Timers. Spark Coils. Plugs. Batteries. Dynamos. Magnetos. IGNITION WIRING: Diagrams for Wiring spark Coils. Distributor. OIL ENGINES. LUBRICATION: Methods of Lubricating the Several Parts. MULTIPLE-CYLINDER ENGINES: Description and Construction of Standard Types. REVERSING MECHANISMS: Reversing Propellor. Reversing Gears. Reversing Engines. PROPELLERS: Definitions. Efficiency. Measuring Propellers. Calculations. INSTALLATION: Foundation. Pipin. General Considerations and Description. OPERATION AND CARE OF ENGINES: General Instructions; Hints on Finding Troubles. Care of Engine and Outfit. POWER OF ENGINES: Horse-power. Formulas for Power. Methods of Finding Power. Brakes. SELECTING AN ENGINE: General Considerations as to Type Size and Construction.

DAVEY, NORMAN. *The Gas Turbine.* 100 ill., 6¼ x 9, 262 pp. **\$4.00**

CONTENTS: *The Theory.* General Considerations of the Gas Turbine as a Heat Engine; The Constant-Pressure, Single-Fluid Gas Turbine; Mixed Fluid Turbines; The "Explosion" Gas Turbines; The Variation in Thermodynamic Constants and Its Effect upon Efficiency. *The Practice.* Accessory Machinery; Practical Limitations; Summary of Efficiencies and Comparison of Types; The History of the Gas Turbine; The Progress in Experimental Work; The Future of the Gas Turbine; List of Gas Turbine Patents, 1856-1913.

A conservative and the only complete up to date book in English on the gas turbine. The author explains all of the various types of gas turbines that have forced their way into practical use, and gives a very complete account of the many experimental researches that were carried on to obtain these finished products.

DUBBEL, H. *High Power Gas Engines.* Translated from the German by F. Weinreb. 423 ill., 15 folding plates, 7 x 10, 200 pp. **\$5.00**

CONTENTS: The Cycle of the Gas Engine; Output and Cylinder Dimensions; The Governing of the Four-Cycle Engine; Valve Gear of Four-Cycle Engines; Two-Cycle Engines; Valve Gears; Ignition; The Cylinders; Valves and Their Cooling; Pistons and Their Cooling; Piston Rod Couplings; Stuffing Boxes; General Design of Principal Parts; Calculation of the Flywheel Weight; Starting; Piping.

Deals with the theory, principles of operation, and most important constructional features of the large size single-acting and double-acting gas engines, and is intended as a guide for the student when designing large gas engines, as well as to give information about the principal features and details of the large gas engines to engineers who have not specialized in this branch. The theoretical portions of the book deal with the question of efficiency. The matter of compression and mixture ratios are dealt with under the assumption of constant and variable specific heats. The conditions governing the designs of the various engine parts, however, have received special attention. The book is very fully illustrated, containing a large number of sectional drawings of modern engines.

ENNIS, WILLIAM D. *Vapors for Heat Engines.* Ill., 5 x 7, 65 pp. \$1.00

A discussion of the arguments for and against the use of fluids other than steam as working media in heat engines. Beginning with the pressure-temperature curve as limiting the potential efficiency of Carnot, the detailed study shows that the thermal properties of the vapors notably influence efficiency and capacity of apparatus. Some new and interesting criteria of maximum efficiency are developed. There are various new equations, tables, and diagrams: among them, those giving the temperature-entropy characteristics of several volatile vapors. The book is in a sense a companion volume to the author's "Applied Thermodynamics"; but, as a discussion of a subject of some commercial importance, has been made self-explanatory.

GROVER, F. *Practical Treatise on Modern Gas and Oil Engines.* Fifth Edition. 173 ill., 5½ x 7½, 380 pp. \$3.00

CONTENTS: Arrangement of Engine Room; Types of Gas Engines; Self-Starters; Two-Cycle and Other Engines; French Engines; Testing Gas Engines; Indicators; Reducing Gears; Gas Engine Trials; Analysis of Coal Gas; Calculations; Gas Engine Design; Producer Gas; Effects of the Products of Combustion; Acetylene Gas; Gas Engine Efficiencies; Entropy Charts; Petroleum; Oil Engines; Oil Gas Engines; Oil Engine Testing.

GÜLDNER, H. *The Design and Construction of Internal-Combustion Engines.* Translated and revised, with additions on American Engines, by H. Diederichs. A handbook for designers and builders of gas and oil engines. 728 ill., 36 folding plates, 9 x 11, 690 pp.

CONTENTS. VARIOUS METHODS OF OPERATING GAS ENGINES AND THE GAS ENGINE CYCLES. General Considerations. The Various Cycles of Operation. Critical Examination of the Various Cyclic Events. THE DESIGN AND CONSTRUCTION OF INTERNAL COMBUSTION ENGINES. Fundamental Considerations. Determination of Principal Dimensions. General Engine Parts. Special Parts for Gas and Oil Engines. Auxiliaries. CONSTRUCTION. ERECTION AND TESTS OF MODERN INTERNAL COMBUSTION ENGINES. Stationary Engines. Portable and Self-propelled Engines. THE GAS ENGINE FUELS AND COMBUSTION IN GAS ENGINES. Fuel Gases. Liquid Fuels. Fuel Mixtures. Combustion in Gas Engines. APPENDIX. Synopsis of Thermodynamics. Fundamental Principles of Thermochemistry. Some Details from Practice.

This is a careful, reliable, intelligent translation of the best book on internal-combustion engines brought up to date and containing also a large section devoted to American gas engines and American practice. It is the largest and most complete treatise on its subject, containing 151 carefully compiled tables of data both of theoretical and practical value to the designer.

KIRSCHKE, A. *Gas and Oil Engines.* A concise account of the most important types. Translated from the German and adapted to English practice by Chas. Salter. 55 ill., 5 x 7½, 160 pp. \$1.50

CONTENTS: The Indicator; Changes of Conditions Sustained by Gas; Efficiency

of the Heat Engine; Determination of the Useful Work; Coal-Gas as a Source of Power; The Precursors of the Modern Gas Engine; Four-Cycle and Two-Cycle Engines; The New Otto Engine; General Construction and Erection of Gas Engines; Valve-Gear, Ignition and Governors; Starters for Gas Engines; Gas Engines for Liquid Fuels; The Diesel Engine; Gas Producer Plants; Blast-Furnace Gas and Other Industrial Waste Gases; High Power Gas Engines; Working Costs; Gas Engine vs. Steam Engine; Gas Turbine; Tables.

LUCKE, C. E. *Gas Engine Design.* With figures and diagrams. *Second Edition.* 145 ill., 6 x 9, 262 pp. **\$3.00**

CONTENTS: Power; Efficiency; Economy; Forces in the Engine Due to Gas Pressure and Inertia; Dimensions of the Engine Parts.

MARSHALL, W. J., and SANKEY, H. R. *Gas Engines.* 125 ill., 6 x 8½, 293 pp. (Van Nostrand's Westminster Series.) **\$2.00**

CONTENTS: Theory of the Gas Engine; The Otto Cycle; The Two-Stroke Cycle; Water-Cooling of Gas Engine Parts; Ignition; Operating Gas Engines; The Arrangement of a Gas Engine Installation; The Testing of Gas Engines; Governing; Gas and Gas Producers.

MATHOT, R. E. *Construction and General Working of Internal Combustion Engines.* Translated from the French by W. A. Tookey. Ill., 6 x 9, 576 pp. **\$5.00**

CONTENTS: HISTORICAL AND RETROSPECTIVE. The Progress of Gas Power Gas vs. Steam Engines. The Future of Gas Power. CONSTRUCTION AND DESIGN. Principal Types of Engines. Horizontal Gas Engines. Vertical Gas Engines. Marine Gas Engines. Two-Cycle Engines. Four-Cycle Engines. The Working of Gas Engines. Governing and Valve Gears. Details of Construction. Moving Parts. POWER AND EFFICIENCY. Testing and Testing Apparatus. Indicator Diagrams and Explosion Records. Results of Trials. Dimensions, Classifications and Tests of Engines. Bibliography.

PURDAY, H. F. P. *Diesel Engine Design.* 271 ill., 5½ x 8½, 311 pp. *In Press*

CONTENTS: First Principles; Thermal Efficiency; Exhaust, Suction and Scavenge; The Principle of Simplicity; Crank-Shafts; Fly Wheels; Framework; Cylinders and Covers; Running Gear; Fuel Oil System; Air and Exhaust System; Compressed Air System; Valve Gear.

WIMPERIS, H. E. *The Internal Combustion Engine.* A text-book for the use of students and engineers. *New and Enlarged Edition.* 104 ill., 6 x 8¾, 336 pp. **\$3.00**

CONTENTS: Chief Symbols Used; Tables of Constants; Molecular Weights of Gases; History of the Internal Combustion Engine; Use of Compression; Comparative Economy; Thermodynamic Cycles; Combustion and Explosion; Thermodynamics; The Gas Engine; The Gas Producer; Blast-Furnace and Coke-Oven Gases; Oil and Petrol Engines; Petrol Engine Efficiency and Rating; Answers to Examples.

WIMPERIS, H. E. *Primer of the Internal Combustion Engines.* 60 ill., 5 x 7, 145 pp. **\$1.50**

CONTENTS: Introductory. Theory of Heat. Behavior of Gases and Vapors. The Ideal Engine. The Real Engine. Fuels and Gas Producers. Engine Details. Engine Tests.

A thorough but concise treatment of the whole subject intended as an introduction to more exhaustive books for those who are studying the subject for the first time.

WIMPERIS, H. E. *The Principles of the Application of Power to Road Transport.* 24 ill., 5 x 7½, 146 pp. \$1.50

CONTENTS: General Survey of Subject; Transport on Land, Sea and in Air; Early Construction of Roads; Use of Steam Power; Internal Combustion Engines; Electricity; Resistance to Motion in Relation to Loads, Speeds, Wheel Diameters, Nature of Tiers; Amount of Power Necessary; Watt-Hours per Ton-Mile; Measurement of Power; I. H. P., B. H. P.; Torque; Efficiency; Road Tests; Measurement of Speed and Resistance; Use of Accelerometer; Loss of Power in Engine Friction and in Transmission Gear; G. T. M.; General Types of Steam and Internal Combustion Engines and on Vehicles on Which They Are Used; H. P. per Ton; Use of Gearing; Ideal Tractive Effort Curve; Loads; Gradients; Relationship of Engine Dimensions and Gear Ratios to Work to be Done; Design of Vehicles Propelled by (1) Internal Combustion Engines, (2) Steam Engines; Wheel Diameters; Braking; Electric and Petrol-Electric Systems; Curve of Ideal Tractive Effort; Hydraulic Systems; Energy Stored in Moving Vehicles; R. A. C. Brake Horse-Power Tests, 1912; Road Test Report Form.

AUTOMOBILES

BOTTONE, S. R. *Magnetos for Automobilists: How Made and How Used.* A handbook of practical instruction in the manufacture and adaptation of the magneto to the needs of the motorist. *Second Edition.* 35 ill., 5 x 7, 118 pp. \$1.00

CONTENTS: The Magneto; Component Parts of the Magneto; Magnetization; The Armature Screen; High Tension Magnetos; Practical Hints; Latest Types of Magnetos.

BUTLER, H. J. *Motor Bodies and Chassis.* A textbook dealing with the complete car for the use of owners, students, and others. With a foreword by the Rt. Hon. The Lord Montague of Beaulieu. 39 ill., 6 x 9, 352 pp. \$3.00

CONTENTS: Varieties of Motor Bodies Defined. Dimensions of the Body. Body Design; Phaetons, Limousines, Landaulettes and other Designs. The Coachbuilder and the Motorist. Motor Body Drawing. Motor Body Making. Mounting. Comfort in the Motor Body. Decoration of the Car. Painting. Stove Enameling and French Polishing. Weather Protection. Interior Illumination. Exterior Illumination. Body Accessories. How to Choose a Chassis. The Petrol Engine. Ignition. Cooling the Cylinder. Transmission. Lubrication. Brakes. Steering Gear. Wheels. Tires. Springs. Chassis. Accessories. Preservation of the Car. Motor-ing and Its Cost. Commercial Motoring and Its Cost.

CLARK, A. GRAHAM. *Text-Book on Motor Car Engineering.* In two volumes.

Vol. I. Construction. 213 ill., 6 x 8¾, 445 pp. \$4.00

CONTENTS: The General Principles and Construction of the Petrol Engine. Details of Engine Construction. Petrol. Fuels Other than Petrol. Carburettors and Carburation. Thermodynamics of the Petrol Engine. Horse-Power. Mechanical, Thermal and Combustion Efficiencies. Principles and Construction of Coil and Accumulator Ignition. Magneto Ignition. Engine Control Systems. Engine Cooling Systems. Crank Effort Diagrams. Clutches and Brakes. Change Speed Gears. Transmission Gears. Steering Gears. Lubricants, Lubrication, Ball and Roller Bearings. Chassis Construction. General Principles of the Steam Car. Steam Engines and Condensers. Steam Generators and Pipe Diagrams. The Electric Car. Materials Used in Motor Car Construction. Syllabus of the City and Guilds of London Institute in Motor Car Engineering. Examination Papers. Physical Properties of Petrols. Mathematical Tables and Constants.

Vol. II. Design. 67 ill., 6 x 8¾, 404 pp.

\$3.50

CONTENTS: Introduction; Materials of Construction; General Considerations in Engine Design; Power Requirements; Determination of Engine Dimensions; Cylinders and Valves; Valve Gears; Pistons, Gudgeons and Connecting Rods; Crankshafts and Fly-wheels; The Balancing of Engines; Crankcases and Gear-boxes; Engine Lubricating and Cooling Arrangements, Inlet, Exhaust and Fuel Piping, etc.; Clutches and Brakes; Gearing; Transmission Gear; Frames, Axels and Springs-Torque and Radius Rods; Steering Gears.

DOMMETT, W. E. Motor Car Mechanism. 102 ill., 5 x 7½, 202 pp. \$2.00

CONTENTS: The Engine; Properties of Gases; Brake Horse-Power, Dynamometers, Empirical Formula for Horse Power, and Mechanics Problems. *Valves.* Construction, Arrangement, and Actuation; Sleeve, Rotary Plug, Piston, Rotary Disk, Main Piston Acting as a Valve; Fuels and Carburetters; Lubrication and Lubricating Systems; Magnetos and Accumulators; Cooling Systems; Traction; Frames and Springs; Front Axles; Steering Gear; Clutches; Speed Gears and Brakes; The Back-Axle, Cardan Shaft, Radius Rods, Torque; Steam Cars; Other Transmission Systems; Appendix.

DYKE, A. L. Automobile and Gasoline Engine Encyclopedia. Treating on the construction, operation and repairing of automobiles and gasoline engines, also trucks, tractors, airplanes and motorcycles. *Tenth Edition.* Ill., 6½ x 10, 940 pp. \$5.00

CONTENTS: Engines; Carburetion; Cooling and Lubrication; Ignition; Coil and Battery; Magnetos; Electric Systems; Operation, Care, etc.; Tires; Miscellaneous; Supplements.

FRASER, EDW. S., and JONES, RALPH B. Motor Vehicles and Their Engines. A practical handbook on the care, repair and management of motor trucks and automobiles for owners, chauffeurs, garagemen and schools. 278 ill., 6 x 9, flexible fabrikoid, 357 pp. \$2.00

CONTENTS: The Gas Engine; Principles of Two and Four-Cycle Engines; Timing; Engine Balance and Firing Order; Cooling Systems; Fuel Feed Systems; Fuels; Elements of Carburetion; Carburetors; Puddle Type Carburetors; Magnetism; Elementary Electricity; Batteries; Induction; Battery Ignition Systems; Magnetos, Rotor Type; Dual and Duplex Ignition Systems; Starting and Lighting Systems; Power Transmission; Clutches; Transmissions; Drives; Differentials; Running Gear; Tires and Rims; How to Drive; Engine Troubles Experienced on the Road; Lubrication; Care and Adjustment; Care and Adjustment Tables.

A complete book on the automobile written in the simplest language and with technicalities reduced to a minimum. The fundamentals of gas motor operation, as well as the care and operation of the principal accessories of motor vehicles are discussed in detail and at greater length than usual. The last four chapters are the result of the authors' observations and experience with the great number of trucks, tractors, automobiles and motorcycles operating under their supervision, and a study of them will be of great help in obtaining the maximum economy, efficiency and life of the apparatus.

SCHAEFER, C. T. Motor Truck Design and Construction. 292 ill., 6 x 9, 326 pp. \$2.50

CONTENTS: The General Layout of the Chassis; The Motor Truck Engine, Its Construction and Lubrication; The Motor Cooling System; Carburetion and Carburetors; Ignition Systems; Governors and Speed Controlling Devices; The Clutch and Transmission; Universal Joint and Propeller Shaft; The Differential; The Final Drive; Front and Four Wheel Drives; Motor Truck Brakes; The Front Axle; Steering Gears and Fundamental Principles of Steering Mechanisms;

Motor Truck Frames; Power Plant Mountings; Springs and Spring Suspensions; The Fuel Supply System; Control; The Muffler; Motor Truck Wheels; Motor Truck Tires and Rims; Electric Lighting and Starting on Commercial Vehicles. This volume has been written to fill a pressing want; to give a practical discussion of the gasoline propelled commercial car of the present type, and to present this subject in the plainest possible manner by the use of numerous illustrations. In other words, this work is compiled for the engineer, who, when he desires information on current practice, may quickly obtain the same without a general study. At the same time a general outline of the underlying principles is given for the student, commercial vehicle owner and operator who may desire to familiarize himself with the construction of the various units that make up the complete vehicle.

AVIATION AND AERONAUTICS

BEDELL, FREDERICK. *The Air Propeller.* Its working characteristics and theory, with a brief discussion of the airplane engine and the power available for airplane propulsion. Ill., 6 x 9, paper, 96 pp. **\$1.00**

CONTENTS: Power Available from the Air Propeller and the Airplane Engine; The Airplane Engine; The Air Propeller; Introductory, Conditions of Propeller Operation, Propeller Characteristics, Propeller Theory; Appendix.

BEDELL, FREDERICK. *Airplane Characteristics.* A systematic introduction for flyer and student and for all who are interested in aviation. 50 ill., 6¼ x 9¼, 123 pp. **\$1.60**

CONTENTS: Sustenation; Relations in Flight; Resistance; Lateral Stability; Directional Stability; Appendix: Thrust Characteristics; Power Characteristics; Control and Other Diagrams.

BEDELL, FREDERICK. *The Airplane.* Ill., 6 x 9. *In Press*

Most of the chapters in this book will consist of material published for the first time. Six chapters will consist essentially of material that has appeared in Bedell's "The Air Propeller" and "Airplane Characteristics."

CHATLEY, H. *Principles and Design of Aeroplanes. Second Edition, Revised.* Ill., 4 x 6, 115 pp. (Van Nostrand's Science Series, No. 126.) **\$0.75**

CONTENTS: The Aeroplane; Air Pressure; Weight and Power; Propellers and Motors; Balancing; Construction; Difficulties; Future Development; Cost; Other Flying Machines; Gyroplane and Ornithoptere.

An elementary text on the design of flying machines without presenting any preconceived idea as to the best type of machine. The history of aviation is touched on only to point out how it affected the progress of the science and practice. The chapter on costs, in this new edition, has been considerably changed and the entire work corrected.

ENNIS, WILLIAM D. *Flying Machines To-day.* 123 ill., 5½ x 8, 218 pp. **\$1.50**

(Author is professor of mechanical engineering at Brooklyn Polytechnic Institute, Brooklyn.)

CONTENTS: THE DELIGHTS AND DANGERS OF FLYING—Dangers of Aviation—What it is Like to Fly. SOARING FLIGHT BY MAN—What Holds it Up. Lifting Power. Why so Many Sails. Steering. TURNING CORNERS—What Happens When Making a Turn. Lateral Stability. Wing Warping. Automatic Control. The Gyroscope. Wind Gusts. AIR AND THE WIND—Sailing Balloons. Field

and Speed. GAS AND BALLAST—Buoyancy in Air. Ascending and Descending. The Ballonet. The Equilibrator. DIRIGIBLE BALLOONS AND OTHER KINDS—Shapes. Dimensions. Fabrics. Framing. Keeping the Keel Horizontal. Stability. Rudders and Planes. Arrangement and Accessories. Amateur Dirigibles. The Fort Omaha Plant. Balloon Progress. THE QUESTION OF POWER—Resistance of Aeroplanes. Resistance of Dirigibles. Independent Speed and Timetable. The Cost of Speed. The Propeller. GETTING UP AND DOWN; MODELS AND GLIDERS; AEROPLANE DETAILS—Launching. Descending Gliders. Models. Balancing. Weights. Miscellaneous. Things to Look After. SOME AEROPLANES—SOME ACCOMPLISHMENTS. THE POSSIBILITIES IN AVIATION—The Case of the Dirigible. The Orthopter. The Helicopter Composite Types. What is Promised. AERIAL WARFARE.

GREENHILL, G. *The Dynamics of Mechanical Flight.* 58 ill., 6 x 9, 127 pp. \$2.50

CONTENTS: General Principles of Flight, Light and Drift; Calculation of Thrust and Centre of Pressure of an Aeroplane; Helmholtz-Kirchhoff Theory of a Discontinuous Stream Line; Gyroscopic Action, and General Dynamical Principles; The Screw Propeller; Pneumatical Principles of an Airship.

A mathematical elucidation of the problems involved in mechanical flight; an attempt at their solution.

KENNEDY, RANKIN. *The Principles of Aeroplane Construction.* 51 diagrams, 5½ x 8½, 145pp. \$2.00

CONTENTS: Elementary Mechanics and Physics. Principles of Inclined Planes. Air and Its Properties. Principles of the Aeroplane. The Curves of the Aeroplane. Centers of Gravity. Balancing; Steering. The Propeller. The Hélicoptère. The Wing Propeller. The Engine. The Future of the Aeroplane.

KENNEDY, RANKIN. *Flying Machines; Practice and Design.* Their principles, construction and working. 62 ill., 5½ x 8½, 162 pp. \$2.50

CONTENTS: Principles of Flying Machines; Practical and Possible Flying Machines; Starting Up Aeroplanes; Miscellaneous Appliances; Materials for Construction of Flying Machines; Dirigible Balloons; Notes on Air Pressures, Wind and Atmosphere; Practical Engineering of Flying Machines.

LANCHESTER, F. W. *The Flying Machine from an Engineering Standpoint.* Ill., 6 x 9, 135 pp. \$3.00

(Author is a member of the British Advisory Committee for Aeronautics.)

CONTENTS: Introduction; The Air Considered as the "Permanent Way"; Catastrophic Instability; The Laws of Resistance; Body-Resistance; Total Resistance; Propulsion; Motive Power Installation; Relating to the Design of the Aerofoil; Resistance of Struts, Wires, Wheels, etc.; Vertical Surface; The Dynamic Load-Factor and Factor of Safety; Landing Gear; Acentric Types of Machine; Stability and Control. *Appendices.* A Discussion of Skin-Friction; A Note of the Stability of the Flying Machine as Affected by Considerations Relating to Propulsion; Report on Test of Author's Aerofoil of 1894; Pneumatic Hydraulic Alighting Mechanism Designed for Messrs. White and Thompson. *A Discussion Concerning the Theory of Sustentation and Expenditure of Power in Flight.* Introduction; Direct Resistance as Related to Skin-Friction; Sustentation in Flight; The Dynamic System.

Deals with those problems in mechanical flight which come more directly within the purview of the aeronautical constructor. Matters of essentially scientific interest, such as the theory of stability longitudinal, lateral, and rotative (or asymmetric), have been in the main taken for granted; that is to say, the results of existing investigations have been assumed as established fact and so stated.

LANCHESTER, F. W. Aerial Flight. Illustrated.

Vol. I. Aerodynamics. 162 ill., 438 pp.

\$6.00

CONTENTS: Fluid Resistance and Its Associated Phenomena; Viscosity and Skin Friction; The Hydrodynamics of Analytical Theory; Wing Form and Motion in the Peritery; The Aeroplane; The Normal Plane; The Inclined Aeroplane; The Economics of Flight; The Aerofoil; On Propulsion, the Screw Propeller, and the Power Expended in Flight; Experimental Aerodynamics; Glossary; Appendices.

Vol. II. Aerodnetics. 208 ill., 433 pp.

\$6.00

CONTENTS: Free Flight; General Principles and Phenomena; The Phugoid Theory; The Equations of the Flight Path; The Phugoid 1852-1872; Dirigible Balloons from 1883-1897; 1898-1906; Flying Machine Theory—The Flight Path Plotted; Elementary Deductions from the Phugoid Theory; Stability of the Flight Path as Affected by Resistance and Moment of Inertia; Experimental Evidence and Verification of the Phugoid Theory; Lateral and Directional Stability; Review of Chapters I to VII, and General Conclusions; Soaring; Experimental; Aerodnetics.

NEILSON, ROBERT M. Aeroplane Patents. 77 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 101 pp. \$2.00

CONTENTS: Advice to Inventors. Review of British Patents; British Patents and Applications for Patents; British Patents and Applications for Patents from 1860 to 1910, Arranged in Order of Application; British Patentees, Arranged Alphabetically; United States Patents from 1896 to 1909, Arranged in Order of Issue; United States Patentees, Arranged Alphabetically.

Intended to give useful hints and data relating to patents, to inventors and manufacturers interested in heavier-than-air flying machines. Many important questions that suggest themselves to patent attorneys, inventors and manufacturers are dealt with in language as simple as possible. The difficulty that users and manufacturers experience in ascertaining how new devices may be used without infringement of patents is met by the section of the book in which many of the important existing are reviewed.

For other books on patents see section on industrial trades.

PETIT, ROBERT. How to Build an Aeroplane. Translated by T. O'B. Hubbard and J. H. Ledeboer. 93 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 131 pp. \$1.50

CONTENTS: General Principles of Aeroplane Design. Theory and Calculation. Resistance, Lift, Power, Calculations for the Design of an Aeroplane, Application of Power, Design of Propeller, Arrangements of Surfaces, Stability, Center of Gravity, etc. Materials. Construction of Propellers. Arrangements for Starting and Landing. Controls. Placing Motor. The Planes. Curvatures. Motors.

PORTER, J. R. The Helicopter Flying Machine. Ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 88 pp. \$1.50

CONTENTS: The Aeroplane; Lifting Screws; The Helicopter; Description of Nos. 1 and 2 Turbine Machine; Theory Applied to the Centrifugal Propeller Machine; The Deflecting Surface; Further Theoretical Considerations; Resistance to Forward Motion; Stability Under Various Conditions; Parachute Action; Motor and Gearing; Stresses; Conclusions; Tables of Squares and Cubes.

WIDMER, EMIL J. Military Observation Balloons (Captive and Free).

A complete treatise on their manufacture, equipment, inspection, and handling, with special instructions for the training of a field balloon company. 39 ill., 2 folding plates, $5 \times 7\frac{1}{2}$, flexible fabrikoid, 158 pp.

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of Crew; High Transportation; Marching Order of the Balloon Transportation; Lifting Over Obstacles; Deflation and Refilling of the Balloon; The Use of a Kite Balloon in Time of War; The Rules for Examining and Accepting the Cloth to be Used in the Manufacture of a Kite Balloon; The Care of the Kite Balloon Material and the Repair of Same; Materials Used; The Spherical Captive Balloon; Equipment of the Spherical Balloon; Inflation, Anchoring, Ascension; The Free Balloon; Equipment of the Free Balloon; Preparation for Ascension; The Ascension.

PUMPS

INNES, C. H. Centrifugal Pumps, Turbines and Water Motors. Including the theory and practice of hydraulics. *Fifth Edition.* 287 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 350 pp. **\$3.00**

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LOEWENSTEIN, L. C., and CRISSEY, C. P. Centrifugal Pumps, Their Design and Construction. 320 ill., 8 folding plates, $6\frac{3}{4} \times 9\frac{3}{4}$, 432 pp. **\$5.00**

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COMPRESSED AIR

INNES, C. H. The Fan: Including the Theory and Practice of Centrifugal and Axial Fans. 142 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, cloth, 258 pp. **\$4.00**

CONTENTS: Conservation of Energy; Losses of Head; Manometer, Anemometer and Pilot Tube; Calculation of Density of Air; Change of Moment of Momentum; Theoretical Characteristics; Design of Fans; Variation of Pressure in Centrifugal Fans; Various Tests on Fans; Comparison Between Theory and Experiment; High Pressure Fans; Theory of Propeller Ventilating Fans; Experiments; Types of Propeller Ventilating Fan.

WEISBACH, J., and HERRMANN, G. Mechanics of Air Machinery. Authorized translation, with an appendix on American practice by A. Trowbridge. 92 ill., 8vo, 213 pp. **\$3.75**

CONTENTS: Movement of Air by Difference of Temperature; Natural Ventilation; Artificial Ventilation; Theory and Practice; Blowing Engines; Vacuum Pumps; Tuyeres; Hot Air Blast; Clearances in Blowers; Losses due to Various Causes; Indicating of Blowers; Resistance in Blowers; Sizes of Blast Reservoirs and Tuyeres; The Hot Air Blast; Design of Piston Blowers; Compressors; Driving Force of Blowers; Fly-wheels of Cylinder Blowers; Rotary Blowers; Fans; Recent American Practice.

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HAUSBRAND, E. **Drying by Means of Air and Steam.** With explanations, formulas, and tables, for use in practice. Translated from the German by A. C. Wright. Ill., $5 \times 7\frac{1}{2}$, 77 pp. **\$2.50**

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LEASK, A. R. **Refrigerating Machinery.** Its principles and management. *Fourth Edition.* Ill., 5×7 , 296 pp. *Reprinting*

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WALLIS-TAYLER, A. J. **Refrigeration, Cold Storage and Ice-Making.** A practical treatise on the art and science of refrigeration. With which is incorporated "Refrigerating and Ice-Making Machinery." *Third Edition, Thoroughly Revised.* 414 ill., 6×9 , 610 pp. **\$5.50**

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CONTENTS: History of the Iron and Sheet Metal Working Industry; The Material and Its Properties; Devices and Machines for Bending Sheet Metal; Presses and Tools; Curling and Flattening Sheet Metal; Raising and Hollowing; Can Making; Slot-Punching Machine; Machines for Making Cutting Tools; Press Tools for Making Water Pails; Drawing; Simple Burr Trimming Device; Clamps; Rolling Thin Plate; Electric Drive; Standardization; Tool Materials, Their Use and Treatment; Learning a Trade; Pneumatic Tools; Appendix and Tables.

PRATT, JAMES A. *Elementary Machine Shop Practice.* *In Press*

CONTENTS: Machine Shop Small Tools; Filing; Scraping; Flat and Cylindrical; Development of Measurement; Measuring Instruments, Linear and Angular; Drill and Wire Gauges; Hardening and Tempering; Annealing; Machine Adjustments; Belting; Emery Wheels and Grindstones; Polishing Wheels; Lathe Tools; Lathe Operation; The Standard Tapers; Drill Press Practice; Sharper Operation; Slotter Operation; Grinder Operation; Milling Machine Operation; The Elements

of Gearing; Planer Operation; Machine Shop Calculations; Glossary of Machine Shop Terms.

RANKINE, W. J. M. *A Manual of Machinery and Millwork. Seventh Edition, Revised*, by W. J. Millar. 289 ill., 6 x 9, 617 pp. **\$6.00**

CONTENTS: *Geometry of Machinery*; Elementary Rules of Descriptive Geometry; Motions of Primary Moving Pieces in Machines; Motions of Secondary Moving Pieces; Elementary Combinations in Mechanism; Aggregate Combinations; Adjustments; *Dynamics of Machinery*; General Principles; Performance of Work by Machines; Regulating Apparatus; Efficiency and Counter Efficiency of Pieces, Combinations and Trains in Mechanism; *Materials, Construction and Strength of Machinery*; Materials Used; Strengths of Materials; Action of Cutting Tools.

REULEAUX, F. *The Constructor*. A handbook of machine design. Authorized, complete and unabridged translation from the *Fourth Enlarged German Edition* by H. H. Suplee. 1200 ill., 9¼ x 12, 330 pp. **\$4.00**

CONTENTS: *Strength of Materials*. This section contains Tables, Formulas and full data for determining the strength of all forms used in construction, including Beams, Columns, Plates, Rings, Springs, etc., in all materials in practical use. *The Elements of Graphostatics*. Containing a clear explanation of the method of making calculations by use of lines instead of algebraic formulas, and showing the application of the method to Machine Design as fully as it has heretofore been used for Framed Structures. *The Construction of Machine Elements*. Riveting; Hooping; Keying; Bolts and Screws; Journal; Lateral and Thrust; Bearings: Lateral and Thrust; Supports for Bearings; Axles; Shafting; Couplings, Rigid, Flexible and Clutch; Simple Levers; Cranks; Combined Levers; Connecting Rods; Cross Heads; Friction Wheels; Toothed Gearing; Ratchet Gearing, a new and very full treatment of this important subject; Tension Organs, including Belts, Hemp Rope, Wire Rope and Chains, generally considered; Belting, Including Capacity and Efficiency, also Proportions of Pulleys; Rope Transmission, Including Hemp, Cotton and Wire Rope; also Proportions of Sheaves, Construction of Stations, and Arrangement of Long Distance Transmission Systems; Chain Transmission; Pressure Organs, Including Water Motors, Pumps, Water-Pressure Engines, Steam Engines, Steering Gear and Meters; Conductors for Pressure Organs, Including Pipes, Pipe Connections, Pistons, Plungers, Stuffing Boxes, and a discussion of Long Distance Hydraulic Transmission; Reservoirs for Pressure Organs, Including Tanks, Accumulations and Steam Boilers; Valves, Including all Kinds of Lift and Slide Valves, Both Self-Acting and Mechanically Operated. *Mathematical Tablets*. Including Tables of Curves, Areas, and Volumes Giving Rectangular and Polar Equation, Moment of Inertia, Radius of Curvature, Rectification, and Center of Gravity; also Tables of Trigonometrical Functions and Formulæ, Squares, Cubes, Square Roots and Cube Roots, Reciprocals, etc., and many constants.

SAUNDERS, C. H. *Handbook of Practical Mechanics for Use in the Shop and Draughting Room*. Ill., 225 pp. **\$1.50**
Leather, with flap. **\$2.00**

CONTENTS: Rules, Tables and Formulas and Solutions of Practical Problems by Simple and Quick Methods; Lathe Thread Cutting; Cams; Bevel and Worm Gears; Standard Keys; Bolts; Tapping Drills; Metric System; Weights of Metals; Speed of Pulleys; Tapers and Angles; Shop Recipes; Wire and Plate Gauges.

SCRIBNER, J. M. *Engineers' and Mechanics' Companion. Twenty-first Edition, Revised*. Ill., 4½ x 6½, leather, 273 pp. **\$1.50**

CONTENTS: U. S. Weights and Measures; French and English Weights and Measures; Synopsis of Arithmetic; Mensuration of Surfaces and Solids; Of Artificer's Work; Engineering; Mechanical Powers and Centers; Strength of Materials;

Hydrodynamics; Motion; Water Wheels; Friction; Effects of Heat; Steam and Locomotive Engines; Weight of Metals, Miscellaneous Notes.

SHAW, THOS. R. *The Driving of Machine Tools.* 139 ill., 37 tables, 4¾ x 7½, 221 pp. \$2.00

CONTENTS: Cone Pulleys and Gearing; Application of the Cone Pulley; The All-Gear Drive; Application of Motor Drive; Planning Machine Drives; Drives for Various Machines; Miscellany; Appendix.

SHAW, THOMAS R. *Precision Grinding Machines.* 170 ill., 5¼ x 8¾, 221 pp. \$5.00

CONTENTS: The Importance and Advantages of Grinding; Cylindrical Grinding Machines; Plane Surface Grinding Machines; Bed and Table Constructions; Driving Arrangements; Reversing Mechanism and Automatic Feed; the Wheel Head; Work Heads and Tailstocks; Work Holding Devices; Profile and Form Grinding; Grinding Wheels; Care and Operation of Grinding Machines; Appendix.

General principles governing design and operation in order to get the most satisfactory results are given from actual workshop practice. This book will be equally beneficial to the engineer and the operator, and help to a better understanding and consequently better appreciation of the possibilities of grinding, with the inevitable result of increased efficiency in the workshop.

SMITH, F. E. *Handbook of General Instruction for Mechanics.* Containing useful rules and formulæ for practical men. 126 ill., 5¼ x 7¾, 336 pp. \$1.50

CONTENTS: Arithmetic; Arithmetical Signs and Characters; Explanation of Solving Formula; Mensuration; Weight; Specific Gravity; Finding Dimensions, Measurements and Weight of Different Shaped Vessels and Determination of Weight of Different Parts; Primary or Simple Machines; Strength of Materials and Questions Relating to Stress; Answers.

SMITH, ROBERT H. *Text-Book of Advanced Machine Work.* Prepared for students in technical, manual training, and trade schools, and for the apprentice in the shop. *Third Edition, Revised and Enlarged.* 609 ill., 5¼ x 8¼, 575 pp. \$3.00

(Author is instructor of machine tool work at Massachusetts Institute of Technology.)

CONTENTS: Engine Lathe Work; Cutting Tools; Measuring; Turning; Fitting; Threading; Chucking; Reaming; Mandrels or Arbors; Curve Turning and Forming; Inside Calipers and Inside Micrometers; Boring and Inside Threading; Brass Finishing; Broaching; Drilling Jigs; Boring, Boring Bars and Boring Machines; Eccentric Turning; Nurling; Cylindrical, Internal Surface and Cutter Grinding; Planing; Milling; Spur, Bevel, Worm and Spiral Gear Cutting; Tool-making; Spiral Milling; The Plug and Button Methods of Locating Holes of Precision in Jigs and Fixtures; Sine Bar.

SMITH, ROBERT H. *Text-Book of the Principles of Machine Work.* Prepared for students in technical, manual training, and trade schools, and for the apprentice in the shop. *In Press*

CONTENTS: Metals and Materials Used in Machine Construction and Names the Tools and Instruments and Schedules of Operations of Hand Processes; It treats of Laying Out Work; Chipping, Filing and Scraping; Hardening and Tempering Carbon and High-speed Steels; Pipe Fitting; Soldering and Brazing; Lacing Belts, Alining Shafting and Installing Machines; Drills and Drilling; Taps and Tapping; Speed Lathes, Hand Tools and Hand Turning; Pneumatic Chipping and Riveting; Autogenous Welding.

The aim of these books—"Advanced Machine Work" and "Principles of Machine Work"—is to give the beginner the advantages of text-books that he may acquire the fundamental as well as advanced principles in a logical, sys-

tematic, and progressive manner and in the shortest time possible. Machines, mechanisms and tools are illustrated graphically by means of original perspective and mechanical drawings, and briefly and systematically described by condensed tables. Operations in machining, standard and typical problems in machine construction are given in condensed schedules which name the material, operations, machines, speeds, feeds, jigs, fixtures and tools. Calculations are supplied by condensed rules and formulas. Facts and principles are supplied which a student or apprentice in school or shop must rediscover or obtain from instructor or foreman.

ZUR NEDDEN, F. *Engineering Workshop Machines and Processes.* A handbook for the use of students and others taking the workshop training recommended by the Institution of Civil Engineers. Translated and revised by John A. Davenport, with an Introduction by Alex. B. W. Kennedy. Ill., $5\frac{1}{2} \times 8\frac{3}{4}$, 231 pp. **\$2.00**

CONTENTS: General Remarks. The Modern Engineering Works. The Materials of Construction. Foundry and Pattern Shop. Forging. The Machine Shop. Measuring and Marking-off. Fitting, Erecting and Testing. Appendix. The Education and Training of Engineers.

This work attempts to fill the gap that exists between the usual theoretical training of the engineer and his practical work. The author links the commercial side of engineering practice with the theoretical and scientific, and points out how the cost of materials in the uses to which it is put and other considerations enter into the design of a machine.

GEARS AND GEAR CUTTING

HALSEY, F. A. *Worm and Spiral Gearing. Second Edition, Revised and Enlarged.* 26 folding plates, $3\frac{3}{4} \times 6$, boards, 95 pp. (Van Nostrand Science Series, No. 116.) **\$0.75**

CONTENTS: *Worm Gearing.* Theory of Worm Efficiency; Examples from Practice; Limiting Speed and Pressure; Step Bearings. *Spiral Gearing.* Spiral Gears Compared with Spur Gears; Speed Ratio; Preliminary Solution; Lengths of Normal Helixes; Final Solution by Changing the Center Distance; Graphical Solution with Changed Center Distance; Final and Graphical Solutions with Unchanged Center Distance; Finding the Pitch of the Tooth Helix; Special and Graphical Solutions for a Helix Angle of 45 Degrees; Special and Graphical Solutions for Gears of Equal Diameters; Selection of the Cutter.

HORNER, JOSEPH G. *Gear Cutting. In theory and Practice.* 367 ill., $6 \times 8\frac{3}{4}$, 406 pp. *Reprinting*

CONTENTS: *Principles of Design.* Elements of Tooth Forms; Tooth Curves; Pitches; Tooth Proportions; Gears Related to the Spurs; Bevel Gears. *Methods of Cutting.* Form Cuttings; Form Planing and Generating Methods. *Machines.* Machines Using Form Cutters; Form Planing; Machines That Generate by Planing Tools; Machines That Generate Bevels by Planing; Generating by Hobbing; Generating by Milling; Materials, Manufacture and Strength; Appendix.

INGHAM, A. E. *Gearing.* A practical treatise. 57 ill. 6×9 , 194 pp. **\$2.50**

CONTENTS: Spur Gears; Bevel Gears; Worm Gearing; Spiral Gearing; Spiral Gears; Helical Gears; Appendix.

Presents in a very simple manner the general scientific principles which underlie the subject, and gives particulars of the most approved methods of solving problems associated with the various forms of gears. The information is described and classified, and numerical examples are included illustrating the application of data. Numerous tables and charts are given from which almost the whole of the necessary particulars can be obtained without calculation.

WHITE, G. T. Toothed Gearing. 136 ill., $5 \times 7\frac{3}{4}$, 226 pp. **\$2.00**

CONTENTS: Kinematics; The Spur Wheel, Cycloidal Teeth; Annular Wheels, Cycloidal Teeth; The Spur Wheel, Involute Teeth; Obliquity of Action; Pin Gearing; Non-Circular, Lobed, Helical, Bevel and Skew Bevel Wheels; Worm Gearing; Oblique Worm and Wheel; Screw Wheels or Spiral Wheels; Strength of Teeth; Durability Trains of Wheels; The Odontograph.

ILLUMINATION

BLOCH, L. The Science of Illumination. An outline of the principles of artificial lighting. Translated by W. C. Clinton. 47 ill., 32 tables, $5\frac{1}{2} \times 8\frac{3}{4}$, 190 pp. **\$2.50**

CONTENTS: Fundamental Units in Illumination. Measurement and Calculation of Luminous Intensity, or Candle-Power. Estimation of Illumination. Calculation of Illumination. Measurement of Illumination. Indirect Lighting. Appendices.

Deals with the estimation, calculation and measurement of illumination. The book starts with an exposition of the fundamental principles and gives methods for determining mean spherical and mean hemispherical candle power. The methods of predetermination for direct lighting are shown to be applicable to indirect lighting provided the necessary experimental data are available.

ECK, J. Light, Radiation and Illumination. Translated from the German of Paul Hogner. 59 ill., folding plates, $5\frac{1}{2} \times 8\frac{1}{2}$, 100 pp. **\$2.50**

CONTENTS: Light Emission from Surfaces; Light Emission from Bodies; Light Emission from Arc Lamps; Illumination (Radiation Density); Unidirectional Illumination; Calculation Methods; The Horizontal Surface Illumination of Streets and Open Spaces; Determination of Vertical Surface Illumination from Mean Horizontal Surface Illumination.

HOUSTOUN, R. A. Studies in Light Production. 22 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 120 pp. **\$2.00**

CONTENTS: The Energy Spectrum; The Black Body; Flames; Welsbach Mantle Carbon Glow Lamp; The Arc; The Nernst Lamp; Metal Filament Lamps; The Mercury Arc; Light of the Future; On the Absolute Measurement of Light; A Proposal for an Ultimate Light Standard; On Apparatus and Experimental Methods. These studies were written for the purpose of collecting information about the efficiency of our artificial illuminants as energy transformers, both for the sake of rendering the facts readily accessible and also for information as to the lines future progress is likely to take.

ACETYLENE LIGHTING

GIBBS, W. E. Lighting by Acetylene, Generators, Burners and Electric Furnaces. *Second Edition, Revised.* 66 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 170 pp. **\$1.50**

CONTENTS: Acetylene; Dangers; Electric Furnaces; Generation of Acetylene; Dry and Wet Process Generators; The Plunger; Impurities of Carbide and Acetylene; Lamps; Burners; Experiments; Fire Regulations; U. S. Patents.

GAS AND GAS LIGHTING

BIRCHMORE, W. H. Interpretation of Gas Analyses. Ill., $5 \times 7\frac{1}{2}$, 86 pp. **\$1.25**

CONTENTS: Introduction; The Translation of the Analysis; The Atmosphere;

Specific Gravity and Liter Weights; Combustion; Products; The Immaterial Products of Combustion; Tension of Aqueous Vapor According to Regnault.

FRANZEN, H. *Exercises in Gas Analysis.* Translated from the first German edition, with corrections and additions by the author, by Thomas Callan. 30 diagrams, $5 \times 7\frac{1}{4}$, 127 pp. **\$1.00**

Presents a systematic introduction to the methods used in gas analysis, grading the exercises carefully from easy to more difficult ones, and to each exercise adding a brief discussion of the theoretical questions involved. The well tried methods of Hempel and Bunte have received special attention.

HOLE, W. *The Distribution of Gas. Third Edition.* 687 ill., $6\frac{1}{4} \times 8\frac{3}{4}$, 865 pp. **\$8.50**

CONTENTS: Rights and Duties of Gas Undertakings; Preliminary Considerations; Discharges from Pipes; Discharges from Pipes under High Pressure; Station Governors; Districting; District Governors; Cast Iron Pipes and Irregulars; Steel Pipes and Connections; Joints and Jointing; Main-Laying; Valves and Main Coeks; Subways; Service; Wet-Dry, Prepayment, and Fixing Meters; Pipes and Joints for Internal Fitting; Internal Fitting and Lighting; Gas Fires and Cookers; Gas Engines; Pressure Gauges and Registers; Complaints and Repairs; Gas as an Aid to Ventilation. *Public Lighting.* Low-Pressure Self-Intensifying and High-Pressure Systems; Lighting and Extinguishing Lamps; High-Pressure Distribution and Transmission; Compressors; High Pressure; Distributing Apparatus; Internal Lighting and Heating; Unaccounted-For Gas; Fusion and Electrolysis; Appendix.

A complete and comprehensive treatise embodying all that is required as an outfit on the subject of distribution, not only to students, but also to managers of gas works. This new edition has been much enlarged and brought up to date by the addition of much new matter and the careful compression of the old material.

LANG, K. R. *The By-Products of Coal-Gas Manufacture.* Trans. by Chas. Salter. 13 ill., $5 \times 7\frac{1}{2}$, 162 pp. **\$2.50**

CONTENTS: Production of Coal Gas; Coke; Retort Graphite; Gas Tar; The Gas Liquor; Treatment of the Gas-Purifying Agents; Treating the Cyanogen Sludge; Treating the Crude Liquors; Treatment of the Crude Ammonium Thiocyanate and Cuprous Thiocyanate; Potassium Ferricyanide; The Cyanogen Pigments; Sulphur and Sulphuric Acid.

LATTA, M. N. *Handbook of American Gas-Engineering Practice.* Ill., $6\frac{1}{4} \times 8\frac{3}{4}$, fabrikoid, 477 pp. **\$5.00**

CONTENTS: *Water Gas Manufacture;* Generator; Carburetter; Superheater; Wash-Box and Tar; Scrubbers; Condensers; Purifiers; Exhausters; Station-Meters; Holders; Works Operation; *Gas Distribution;* Naphthalene; Mains; Services; Consumers' Meters; Pressure; House Piping; Appliances; *General Technical Data;* Properties of Gases; Steam; Mathematical Tables; Conversion Factors; Pipe and Miscellaneous Data.

LEWES, V. B. *The Carbonisation of Coal.* A scientific review of the formation, composition and destructive distillation of coal for gas, coke and by-products. 27 ill., $6 \times 8\frac{3}{4}$, 330 pp. **\$5.00**

CONTENTS: The Formation, Composition, Classification, and Distribution of Coal. Form of Retorts used in Gas Manufacture. Coke Ovens and their Development. Conditions existing in the Destructive Distillation of Coal. Primary Gaseous Products of the Destructive Distillation of Coal and the Bodies from which it has been formed. Tar; Its Formation, Use and Decomposition. Coke. Nitrogen and Sulphur of Coal, and their Recovery. Modern Coal Gas. Appendix.

The chemical and mechanical principles involved in the destructive distillation of coal are carefully pointed out and the work of various investigators critically presented together with much data gathered from the author's own recent investigations and he attempts to define the probable lines along which future advances in the carbonization of coal may be expected.

LUNGE, GEORGE. *Technical Gas Analysis.* 143 ill., 6 x 9, 422 pp. \$4.50

CONTENTS: *General Remarks on Technical Gas.* Sampling; Measurement of Gases; Measuring Apparatus; Adjustment or Calibration of Gas-Measuring Apparatus; Measuring in Gas-meters; Various Apparatus for Gas Analysis. *Methods Employed in Technical Gas Analysis.* Estimation of Solid and Liquid Admixtures in Gases; Estimation of Gases by Absorption: (a) by gas-volumetric methods, (b) by titration, (c) by weight; Estimation of Gases by Combustion; Gas Analysis by Optical and Acoustical Methods; Separation of Gases by Low Temperatures; Estimation of the Specific Gravity of Gases; Measurement of Pressure and of Draught; Determination of the Calorific Value and Illuminating Power of Gases. *Special Methods for Detecting and Estimating Various Gases and Vapors Occurring in Technical Operations.* Analysis of Gaseous Mixtures Produced on a Large Scale. Compressed and Liquified Gases. Gas Volumetric Analysis. Appendix. Tables.

A comprehensive and generally useful work for chemists working on gas analysis. The work of other investigators is quoted only where it would be helpful toward a better use of the book, and for this reason the author does not attempt to mention everything published on the subject. This book superseding, as it does, Winkler and Lunge's previous work, is not based on the former, and is in reality an entirely new treatise.

MEADE, ALWYNE. *Modern Gas Works Practice.* With an introductory note by Stanley H. Jones, M. Inst. C. E. 340 ill., 7¾ x 9¾, 540 pp. \$8.50

CONTENTS: The Planning and Laying Out of Gasworks Foundations; Gasworks' Buildings, etc.; The Horizontal Retort Bench; Control of Horizontal Retort Settings; Vertical Retorts and Chamber Ovens; Refractory Materials; Retort-Bench Appurtenances; Mechanical Handling of Materials; Electrical Plant in Gasworks; Gas-Making and Other Coals; Carbonization of Coal; Condensation of Coal Gas; Exhausting Machinery; Preliminary Purification of Coal Gas; Recovery of Cyanogen; Dry Purification of Coal Gas; Storage of Gas; Water Gas: Its Manufacture, Enrichment and Use.

"MENTOR." *Self Instruction for Students in Gas Engineering: Elementary.* Fourth Edition. Ill., 5 x 7¼, 192 pp.

\$2.00

CONTENTS: Carbonization; Effect of Temperature on Quantity and Quality of Gas Produced; Apparatus Employed for Conveying Gas Immediately on Its Leaving the Retorts; Condensation; The Exhauster; Removal of Impurities; Testing for Impurities and for Value of By-Products; Pressure and Exhaust; Construction of Governors; Main and Service Laying; Testing for Illuminating Power; Correcting the Volume of Gas for Temperature and Pressure. Ammonia Recovery.

Advanced. Third Edition. Ill., 5 x 7¼, 245 pp.

\$2.00

CONTENTS: Coals and Coal Testing; Effect of Temperature on Carbonization; Composition of Coal Gas; Testing for Impurities; Gas Analysis; Heating of Retort Settings; Photometry, Calorimetry and Pyrometry; Carburetted Water Gas; Sulphate of Ammonia Manufacture; Labor Saving Machinery; Inclined and Vertical Retorts; Carburation and Naphthalene; Cyanogen Recovery and Purification; Gas Holder Construction; Points in Management; Delivery of Gas Through Mains.

"MENTOR," *Self-Instruction for Students in Gas Supply:*

Elementary. 74 ill., 5 x 7¼, 135 pp.

\$2.50

CONTENTS: Station Governors; General Arrangement of Mains and Use of District Governor; Mains and Main Laying; Plumbing; Gas Meters; Service Laying and Meter Fixing; Interior Fixings; Governors and Burners; Shades, Globes, etc.; Construction and Fixing of Cookers, Fires etc.; Construction and Operation of Gas Engines.

Advanced. 51 ill., 5 x 7 $\frac{1}{4}$, 110 pp.

\$2.50

CONTENTS: Flow of Gas in Mains; Pipes of Various Materials; Electrolysis; Methods of Dealing with Naphthalene and Other Stoppages; Ascertaining the Pressure in Gas Mains; Pressure Recording Instruments; Gases and Their Toxicological Effects; First Aid; High Pressure Distribution; Calorimetry; Information for Gas Fitters; Street and Indoor Lighting; Unaccounted-for Gas; Ventilation; Law Effecting Gas Supply.

NEWBIGGING, T. *Handbook for Gas Engineers and Managers.* *Eighth Edition.* 217 ill., 6 $\frac{1}{2}$ x 8 $\frac{1}{4}$, leather, 596 pp.

\$7.50

CONTENTS: Coal; Chief Kinds of Coal; Storage of Coal; Analyses of Coals and Cannels; Spontaneous Ignition of Coal; Gases Occluded in Coal; Testing of Coal for Its Producing Qualities; Specific Gravity of Coal; Coal Distillation; Gas Production; Retort House; Retort Stack; Retorts; Heating of Retorts; Inclined Retorts; Machine Charging and Drawing; Analysis of Furnace Gases; Retort Bench Mountings; Hydrocarbon and Other Gases and Vapors; Retort House Tools and Appliances; Condensation; Naphthalene; Condensers; Exhausters; Steam Engines and Boilers; Washers; Tower-Scrubbers; Washer-Scrubbers; Bye-Pass Mains and Valves; Tar and Liquor Wells and Tanks; Purification; Purifying House; Purifiers; Notes on Lime; Lime Burning; Station Meters and Other Indicating and Recording Apparatus; Gas-holder Tanks; Gas-holders; Governors; Main Pipes; Main Pipe Joints; Wrought-Iron and Steel Main Pipes; Laying of Main Pipes; Explosions in Main Pipes; Testing of Mains in the Ground; Electrolysis of Mains and Service Pipes; Discharge of Gas Through Main Pipes; Service Pipes and Fittings; Public Lighting; Consumers' Gas Meters; Testing Meters; Internal Fittings; Coal Gas Testings; Appliances and Methods; Tests for Impurities; Illuminating Power; Foreign and Other (proposed) Home Standards of Light; Jet Photometers; Specific Gravity of Gas; Enrichment of Coal Gas; Public Illuminations; Colored Fires; Illumination Devices; Use of Gas for Purposes Other Than Lighting; Residual Products; Coke and Breeze; Coal Tar; Ammonical Liquor; Sulphur Recovery; Cyanogen; Coal Products; Elementary Substances; Chemical and Other Memoranda; The Gas Industry; Cost of Gas-Works; Bricks and Brickwork; Mortar and Concrete; Iron, Steel, and Other Metals; Velocity and Force of the Wind; Specific Gravity and Weight of Various Substances; Office Memoranda; Approximate Multipliers; Tables of Diameters, Circumferences, Areas of Circles and Sides of Equal Squares; Weights and Measures; French Weights and Measures; Decimal System; Money Tables.

O'CONNOR, H. *The Gas Engineers' Pocketbook.* Comprising tables, notes and memoranda relating to the manufacture, distribution and use of coal gas and the construction of gas works. *Third Edition, Revised.* Ill., 4 $\frac{3}{4}$ x 7, full leather, 478 pp.

\$4.00

PUTSCH, A. *Gas and Coal Dust Firing.* A critical review of the various appliances patented in Germany for this purpose since 1885. Translated from the German by Charles Salter. 103 ill., 5 $\frac{3}{4}$ x 8 $\frac{3}{4}$, cloth, 124 pp.

\$2.50

CONTENTS: Generators; Generators Employing Steam; Stirring and Feed Regulating Appliances; Direct Generators; Burners; Regenerators and Recuperators; Glass Smelting Furnaces; Metallurgical Furnaces; Pottery Furnace; Coal Dust Firing.

MATERIALS OF ENGINEERING

ANDREWS, EWART S. *The Strength of Materials.* A textbook for engineers and architects. Ill., 6 x 9, 614 pp.

\$4.00

CONTENTS: Stress, Strain and Elasticity; Behaviors of the Various Materials Under Tests; Repetition of Stresses; Working Stresses; Riveted Joints; Thin

Pipes; Bending Moments and Shearing Forces on Beams; Geometrical Properties of Sections; Stresses in Beams; Deflections of Beams; Columns; Stanchions and Struts; Torsion and Twisting of Shafts; Springs; The Testing of Materials; Fixed and Continuous Beams; Distribution of Shearing Stresses in Beams; Flat Plates and Slabs; Thick Pipes; Curved Beams; Rotating Drums, Disks, and Shafts; Exercises; Appendix; Mathematical Tables.

CHARNOCK, G. F. Mechanical Technology. Ill., 6 x 9, 645 pp. **\$3.50**

CONTENTS: *Production and Properties of the Chief Materials of Construction.* Physical Properties of Materials; Iron; Pig Iron; Wrought Iron; Steel—Classification and Methods of Manufacture; Crucible Cast Steel; The Bessemer Process; The Open-Hearth, or Siemens Process; Structure of Alloys; Steel as an Alloy of Carbon and Iron; Special or Alloy Steels; Nickel, Chrome-nickel, Chrome-vanadium, Tungsten, and Manganese Steels; High-speed Tool Steel; Heat Treatment of Steel; Hardening and Tempering; Annealing; Case Hardening; Non-ferrous Metals—Physical and Chemical Properties, Methods of Smelting, and Chief Uses of Copper, Tin, Zinc, Lead, Aluminium, Antimony, and Nickel; Copper-Zinc Alloys; Copper-Tin Alloys; White-metal Alloys; Anti-friction and Bearing Metals; Miscellaneous Alloys; Properties and Uses of the Principal Varieties of Timber; Defects in Timber; Seasoning; Effects of Shrinkage; Preservation of Timber; Properties and Uses of the Principal Varieties of Stone, and of Cement, Asphalt, Concrete, Asbestos, Abrasive Materials, Carborundum, etc. *Other Materials Used for Mechanical Purposes.* Oils, Lubricants, etc.; Varieties and Methods of Testing; Leather, India-rubber, and Guttapercha, and Their Uses; Leather and Woven Belting; Hydraulic Packing, etc. *Preparatory Processes. Processes Depending upon the Property of Fusibility.* The Production of Castings; Foundry Practice; Precautions in Designing Castings; Stresses Due to Contraction in Cooling; Methods of Moulding, and the Tools and Appliances Employed; Chill Casting—Examples of Its Use; The Foundry, Its Arrangement and Equipment; The Brassfoundry; The Production of Steel Castings; The Small Converter; Malleable Iron Castings; Pouring the Molten Metal; Ladles; Cleaning and Fettling Castings; Defects in Castings and the Remedy; Foundry Mixtures; Chemical Analysis; Calculation of Mixtures; Analysis of Castings for Different Purposes; Aids to Moulding; Plate and Machine Moulding; Examples of Leading Types of Moulding Machines; Core-making Machines; Die Casting. *Processes Depending upon the Properties of Malleability and Ductility.* Operations of Forging and Stamping; Smith Work and the Production of Forgings; Tools Used by the Smith in Forging; Forging Machinery; Steam and Power Hammers for the Smithy; Tools for Steam Hammer Work; Classification of Operations in Forging; The Smithy: Its Arrangement and Equipment; Simple Examples of Hand Forging; The Forge and Its Equipment; The Forge Hammer; The Hydraulic Forging Press; Examples of Heavy Forging in Iron and Steel; Engine Connecting Rods, Crankshafts, etc.; Drop Forging or Stamping, and Examples of Its Use; Nut and Bolt Forging Machine; Bending Press, or “Bull-dozer”; Production of Parts by Rolling; Action of Rolls; The Rolling Mill; Wire-drawing and Wire-drawing Machinery; The Drawbench; The Continuous Process; The Manufacture of Tubes; The Draw-bench for Tubes; Weldless Steel Tubes; Lead Pipe, etc.; Extrusion of Metals; The Manipulation of Sheet Metals by Flanging, Dishing, Drawing, Embossing, etc.; The Drawing Press and Examples of Work; Coining Press.

MARKS, E. C. R. Mechanical Engineering Materials. Their properties and treatment in construction. *Second Edition.* 38 ill., 5 x 7½, 100 pp. **\$1.50**

CONTENTS: Cast Iron; Wrought or Finished Iron; Steel; Copper; Brass; Bronzes; Aluminum; White Metal for Bearings.

MUNBY, ALAN E. Introduction to the Chemistry and Physics of Building Materials. Ill., 6 x 8¼, 365 pp. (Van Nostrand's Westminster Series.) **\$2.50**

CONTENTS: ELEMENTARY SCIENCE: Natural Laws and Scientific Investigations; Measurement and the Properties of Matter; Air and Combustion. Nature

and Measurements of Heat and Its Effects on Materials. Chemical Signs and Calculations. Water and Its Impurities. Sulphur and the Nature of Acids and Bases. Coal and Its Products. Outlines of Geology. BUILDING MATERIALS: The Constituents of Stones. Clays and Cementing Materials. Classification. Examination and Testing of Stones. Brick and Other Clays. Kiln reactions and the Properties of Burnt Clays. Plasters and Limes. Cements. Theories upon the Setting of Plasters and Hydraulic Materials. Artificial Stone. Oxy-chloride Cement. Asphaltate. General Properties of Metals. Iron and Steel. Other Metals and Alloys. Timber, Paints: Oils, Thinners and Varnishes; Bases, Pigments and Driers.

POPPLEWELL, W. C. *Strength of Materials.* A manual for students of engineering. 105 ill., 6 x 9, 192 pp. **\$2.50**

CONTENTS: Stress, Strain and Elasticity; Direct, Tangential and Oblique Stresses; Stresses in Beams; Bending and Shearing Actions; Moment of Inertia Determinations; Deflection of Beams; Shear Stress in Loaded Beams; Relation Between Load and Stress in Prismatic Bar; Pillars, Struts or Columns; Torsion and Springs; Torsion Combined with Bending; Strength of Cylinders; Riveted Joints; Strength of Materials as Shown by the Results of Tests; The Limits of Elasticity; Materials Used in Construction; Questions.

SEXTON, A. H. *Chemistry of the Materials of Engineering.* A handbook for engineering students. *Third Edition.* 35 ill., 5¼ x 7½, 347 pp. **\$3.00**

CONTENTS: The Sources and Chemistry of Iron; Pig Iron; Malleable Iron; Manufacture of Pig and Malleable Iron; Steel; Hardening and Tempering; Preparation; The Foundry; Working of Iron and Steel; Corrosion and Protection; Micro Structure; Copper; Lead, Zinc, Tin; Alloys; Wood; Stone; Clay; Mortars and Cements; Fuel; Water; Lubricants; Paints and Varnishes; Minor Materials.

SMITH, C. A. M. *A Handbook of Testing. MATERIALS.* 135 ills., 6 x 9, 296 pp. **\$2.50**

CONTENTS: Introduction; General Properties of Materials; Machines for Tension, Compression, and Bending Tests; Strain-Measuring Instruments; Methods and Results of Tests on Materials; Torsion Testing; Impact and Hardness Tests; Shear and Miscellaneous Tests; Alternating Stress Tests; The Testing of Cements, Reinforced Concrete and Stone; The Testing of Timber; Experiments in College Laboratories; Appendices; Bibliography; Useful Constants.

SULLIVAN, T. V., and UNDERWOOD, N. *Testing and Valuation of Building and Engineering Materials.* Ill., 6 x 9, about 400 pp. *In Press*

TIMBER

BATERDEN, J. R. *Timber.* 54 ill., 6 x 8½, 360 pp. (Van Nostrand's Westminster Series.) **\$2.50**

CONTENTS: Timber; The World's Forest Supply; Quantities of Timber Used; Timber Imports into Great Britain; European, United States and Canadian Timber; Timbers of South America, Central America, West India Islands, India, Burma, Andaman Islands, Straits Settlements, Malay Peninsula, Japan and South and West Africa, Australian Timbers; Timbers of New Zealand and Tasmania; Causes of Decay and Destruction of Timber; Seasoning and Impregnation of Timber; Defects in Timber and General Notes; Strength and Testing of Timber; "Figure" in Timber.

CHARPENTIER, P. *Timber.* A comprehensive study of wood in all its aspects, commercial and botanical. Showing the different applications

and uses of timber in various trades, etc. Translated from the French by J. Kennell. 178 ill., $6\frac{3}{4} \times 10$, 453 pp. **\$6.00**

CONTENTS: Physical and Chemical Properties of Wood; Description of the Different Species of Wood; Division of the Useful Varieties of Timber in the Different Countries of the World; Forests; The Preservation of Timber; Applications of Timber.

STONE, H. *The Timbers of Commerce and Their Identification.* Illustrated with 186 photomicrographs of sections prepared by Arthur Deane. 5 x 9. **\$4.00**

CONTENTS: Introduction; Practical Hints; Description of Species; Magnoliaceæ; Anonaceæ; Bixineæ; Dipterocarpeæ; Malvaceæ; Tiliaceæ; Zygophyllaceæ; Rutaceæ; Simarubeæ; Olacineæ; Ilicineæ; Platanaceæ; Unknown Species of Dicotyledons; Comferæ; Scales of Measurement; Bibliography.

WAGNER, JOSEPH B. *Seasoning of Wood.* A treatise on the natural and artificial processes employed in the preparation of lumber for manufacture with detailed explanations of its uses, characteristics and properties. 101 ill., 6 x 9, 275 pp. **\$3.00**

CONTENTS: Timber; Coniferous Trees; Broad-leaved Trees; Grain, Color, Odor, Weight and Figures in Wood; Enemies of Wood; Water in Wood; What Seasoning Is; Advantages of Seasoning; Difficulties of Drying Wood; How Wood is Seasoned; Kiln-Drying of Wood; Types of Dry Kilns; Dry Kiln Specialties; Helpful Appliances in Kiln Drying.

Until quite recently very little attention has been paid to the proper seasoning of wood, other than that by keeping lumber exposed for a period of time after sawing it was then ready (seasoned) for use. Recently, however, wood users have become much interested in the operations of kiln-drying and its advantages, so that the need for a practical treatise on technical features of this process is keenly felt. Mr. Wagner's book contains the results of many years of practical working with lumber, and is based on a close study of the different species of wood under varying mechanical temperatures and under different drying processes.

WALLIS-TAYLER, A. J. *The Preservation of Wood.* A descriptive treatise on the processes and on the mechanical appliances used for the preservation of wood. 119 ill., 6 x 9, 344 pp. **\$4.00**

CONTENTS: Destruction of Wood by Decay and the Ravages of Insects; Seasoning or Drying Wood; Preservative Treatment of Wood, Principal Preservative Agents and Processes; Various Proprietary and Other Preservative Solutions; The Absorption Limit and Life of Wood; Fire-proofing and Fire-retardant Treatment of Wood; Cost of Preservative Treatment; Useful Formulæ, Tables, Memoranda, etc.

\$2.00

NAVAL AND MARINE

NAVAL

BARNARD, J. H. *The Naval Militiaman's Guide. Second Edition.* 51 ill., 4¾ x 6, 110 pp. **\$1.00**

CONTENTS: Phraseology; Rigs and Types of Vessels; Spars and Standing Rigging; Sails and Running Rigging; Ground Tackle; Handling Ship's Boats: Under Oars; Under Sail; Handling of Steamers; Minimum Qualifications of Each Naval Militia Grade.

BRASSEY, EARL, and LEYLAND, JOHN (Editors) *The Naval Annual, 1919.* Ill., 6¼ x 9½, 536 pp. **\$10.00**

A summary of the work of the world's navies in the war and a digest, together with statistics of the navies of today.

DINGER, H. C. *Handbook For the Care and Operation of Naval Machinery. Third Edition, Thoroughly Revised and Enlarged.* 150 ill., 5 folding plates, 5¼ x 7¾, flexible fabrikoid, 437 pp. (Van Nostrand's Nautical Manuals.) **\$3.00**

CONTENTS: *Operation of Naval Machinery.* Getting Underway; Running Engines Underway; Accidents Underway. *Care and Overhaul of Main Plant.* General Rules for Overhauling Machinery; Cylinders; Valves and Valve Gear; Engine Adjustments; Lining Up Engines; Oiling Gear; Condenser and Pumps. *Fittings and Auxiliaries.* Joints and Packing; Stuffing Boxes; Lagging and Clothing; Feed and Filter Tanks; Feed Heating; Evaporators and Distillers; Heating System; Steam Launches; Refrigerating Plant; Gages and Thermometers; Revolution Counters; Piping; Valves and Cocks. *Care and Preservation Sub-Division of Hull.* Cleaning, Painting, Points in Doing Work; Care and Sub-Division of Hull. *Special Auxiliary Engines.* Steam Steering Gear; Air Compressors; Blowers and Blower Engines; Hoists and Ejectors; Workshop Machinery. *Spare Parts and Tests.* Outfit of Tools and Spare Parts; Tests of Machinery and Piping.

MARINE BOILERS

GRAY, J. *Practical Design of Marine Single-Ended and Double-Ended Boilers.* 21 ill., 4 plates, 29 tables, 5¼ x 7½, 94 pp. *Reprinting*

Treats the subject of the design of large boilers in a general composite way, giving information of all the difficult points that may arise in connection with this work. A large number of very valuable tables are given that are gathered together here for the first time.

McKNIGHT, J. D., and BROWN, A. W. *Design of Marine and Tubular Boilers.* A treatise for marine engineers, marine draughtsmen and students. 6¼ x 10, 48 pp. **\$2.50**

CONTENTS: Particulars of Boiler; Position of Views; Furnace Centers; Tube Spacing; Detail of Furnace; Longitudinal Section of Boiler; Firebox Side Stays and Bottom Joints; Staying in Steam Space and of Firebox Backs; Details of Shell Riveting; Position of Breast and Bottom Water Space Stays; Detail of Portable Stay; Front and Back Tube Plate Staying; Detail of Reverse Flange Type Furnace.

MARINE ENGINES AND TURBINES

BRAGG, E. M. *The Design of Marine Engines and Auxiliaries.* 110 ill., 4 folding plates, 6 x 9, 192 pp. **\$4.00**

(Author is professor naval architecture and marine engineering in the University of Michigan.)

CONTENTS: *Determination of Cylinder Dimensions. Design of Engine Parts. Working Stress Factors; Shafting; Torsional Vibration of Shafting; Piston Rods; Crossheads and Slippers; Connecting Rods; Pistons; Cylinders and Covers; Main Bearings; Engine Framing; Cylinder Arrangements; Valve Diagram; Valves and Valve Gear. Engine Balancing. Condensers and Air Pumps. Effect of Air upon Condensation. Turning Engines and Reversing Engines.*

A thorough detailed discussion of modern practice in designing and laying down marine engines and their auxiliaries. The methods of designing that are accepted as standards are explained and much of the matter that is original with the author is included.

HOPKINS, N. M. *Model Engines and Small Boats.* New methods of engine and boiler making, with a chapter on elementary ship design and construction. 50 ill., $5\frac{3}{4} \times 8$, cloth, 84 pp. **\$1.25**

CONTENTS: Single and Double Acting Engines; New Method of Cylinder-making; Model Reversing Screw-engine; Shell Boiler; Safety-valve; Water-tube Boiler; Elementary Designing; Hull Construction.

POLLOCK, WALTER. *Hot Bulb Oil Engines and Suitable Vessels.* 368 ill., numerous folding plates, 6×9 , 448 pp. *In Press*

CONTENTS: Historical; Advantages, Requirements; Makes of Engines; Operation of Engines; Various Makes Described; Engine Design, Materials, Reverse Engines; Hot Bulbs, Fuel Pumps, Governors, Engine Parts, Deck Control, Lubrication, Pump Drive, Silencers, Air Containers, Tail Shafts, Propellers; Oil Fuels; Designs of Vessels, Hulls, Shaft Lines, Powers and Speeds, Cargo Capacity, Ocean-Going Vessels, Coasting Vessels, Lighters and Barges, Oil Tankers, Tugs, Auxiliary Sailing Vessels, Fishing Vessels, Tropical Vessels, Yachts, Launches, Canal Barges, Aerial Propulsion, Hopper Barges; Hints on Working Engine; Hints for Installing Engine; Auxiliary Machinery; Motor Winches; Steering Gears; Electric Generating Sets; Air Compressors; Bilge and Deck Service Pumps.

REED, STANLEY J. *Turbines Applied to Marine Propulsion.* 113 ill., folding plates, $7\frac{3}{4} \times 11$, 182 pp. **\$5.00**

CONTENTS: Thermodynamics; Turbine Types; Nozzles and Blades Forms; General Design; Design of the Parsons Turbine and of the Curtis Turbine; Combined or Mixed Turbines; Steam Thrust; Superheat; Transmission; Vacuum; Auxiliary Exhaust; General Notes.

Intended for practical use and little or no mathematics or thermodynamics are entered into. The calculations are intended to be made with a slide rule and graphics, and are accurate only to a degree obtainable by these methods.

SOTHERN, J. W. M. *The Marine Steam Turbine.* A practical illustrated description of the Parsons and Curtis Marine Steam Turbines, etc., as now constructed, fitted, and run (including turbo-generators). A manual of marine steam turbine practice intended for the use of naval and mercantile marine engineer officers. *Fifth Edition*, rewritten, up-to-date and greatly enlarged. 700 ill., numerous folding plates. $6\frac{1}{4} \times 9\frac{1}{2}$, 800 pp. **\$12.50**

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- SOTHERN, J. W. M.** *Marine Engine Indicator Cards.* Containing an exhaustive course of indicator diagrams specially arranged for Board of Trade examination candidates, and also intended for the use of engineer officers of all grades. *Second Edition.* Ill., numerous folding plates, 6 x 9, 226 pp. \$4.50

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- HILLHOUSE, PERCY A.** *Ship Stability and Trim.* 203 ill., 5½ x 8½, 315 pp. \$4.50

CONTENTS: Flotation and Equilibrium; Stability of Floating Bodies; Stability Calculations; The Metacentre; Curves of Stability; Effect of Wind; Free Water; The Center of Gravity; Trim; Definitions.

- HOAR, ALLEN.** *The Submarine Torpedo Boat.* Its characteristics and modern development. 84 ill., 4 folding plates, 5¾ x 8, 228 pp. \$2.00

CONTENTS: Early History and Development; Development of the Present Day Submarine; Characteristics and Requirements; Types; Design; Power Plant; Future Development; Means of Defense Against the Submarine; Tactical Operations; The Modern Automobile Torpedo; Tenders and Salvage Ships; List of Accidents and Causes; Submarine Mines; Appendix; Vessels of the Principal Navies of the World.

An exposition, in non-technical language, of the inherent characteristics of the submarine torpedo boat, the problems involved in its design and construction, the difficulties of operation, its present limitations and future possibilities. This work will interest the general reader and also be of value to the technical man and naval engineer, who, while not specializing in this line, is desirous of reliable information on the subject. The author of this book knows his subject well, and the treatment is strictly in accord with the principles of engineering warfare. Fantastic speculations of many popular newspaper writers find no place in this authoritative and interesting book, which is very fully illustrated both by specially drawn diagrams and photographs.

- LAWS, BERNARD C.** *Stability and Equilibrium of Floating Bodies.* 130 ill., 6 x 9, 257 pp. \$4.50

CONTENTS: Introduction; General Considerations; Ships; Submarines; Floating Docks; Aerial Machines; Caissons.

Attempts to set forth briefly the principles underlying the stability and equilibrium of bodies floating partially or wholly submerged in water and in air. Hitherto published matter on the subject has been confined to ship forms, but in this work problems relating to the stability of submarines and aerial machines are presented. It is necessary to approach the subject in a liberal manner, treating the bodies as subject to active as well as passive forces, and to call into use the principles of fluid pressure—whether liquid or gaseous—in

their action upon bodies at rest or in motion. Most of the data contained in the subject matter was gathered by the author while actively and intimately connected with the scientific side of shipbuilding.

MacBRIDE, J. D. *A Handbook of Practical Shipbuilding With a Glossary of Terms.* 156 ill., 2 folding plates, $5\frac{1}{4} \times 7\frac{3}{4}$, flexible fabrikoid, 231 pp. (Van Nostrand's Nautical Manuals.) **\$2.00**

CONTENTS: Shipyard Organization; Division of Work; Shipyard Tools; Shipways; Keels; Shell Plating; Frames; Floors and Longitudinals; Tank Top, Inner Bottom and Peak Tanks; Stem, Stern Post and Rudder; Bulkheads and Hatches; Hold Stanchions and Foundations; Deck Beams and Plating; Ship Fittings; Joiner Work; Launching; Engine Room and Engines; Boiler Room and Boilers; Propellers; Auxiliary Machinery; Piping Systems; Hull Engineering; Engine Dock Trial; Ship Nomenclature; A Glossary of Terms and Phrase.

NICOL, GEORGE. *Ship Construction and Calculations.* For the use of officers in the mercantile marine, ship superintendents and draughtsmen. *Third Edition, Enlarged.* 360 ill., $6\frac{1}{2} \times 10$, 510 pp. **\$10.00**

CONTENTS: Simple Ship Calculations. Moments, Centre of Gravity, Centre of Buoyancy. Outlines of Construction. Bending Moments, Shearing Forces. Stresses and Strains; Types of Cargo Steamers; Equilibrium of Floating Bodies, Metacentric Stability; Trim; Stability of Ships at Large Angles of Inclination; Rolling; Freeboard; Proposed New Load Line Regulations; Practical Details; Ship Repairs; Appendices.

The problems met with in building and subsequent management afloat of ships, particularly of cargo steamships, are clearly explained.

SEATON, A. E. *A Manual of Marine Engineering: Comprising the Design, Construction, and Working of Marine Machinery. Eighteenth Edition, Thoroughly Revised, Greatly Enlarged, and Mostly Rewritten to Date.* 339 ill., $6\frac{1}{4} \times 9$, 1012 pp. **\$10.00**

CONTENTS: General Introduction; Resistance of Ships and Indicated Horse-Power Necessary for Speed; Marine Engines: Their Types and Variations of Design; Steam Used Expansively; Steam Used After Expansion—Turbines; Efficiency of Marine Engines; Engines—Simple and Compound; Horse-Power, Nominal, Indicated, and Shaft or Brake; General Design and the Influences Which Effect It; The Cylinder and Its Fittings; The Piston—Piston-Rod—Connecting-Rod; Shafting, Cranks and Crank-Shafts; Foundations, Bed-plates, Columns, Guides, and Framing; The Condenser; Pumps; Valves and Valve Gear; Valve Diagrams; Propellers; Sea Cocks and Valves; Auxiliary Machinery; Boiler, Fuels, etc.; Evaporation; Boilers—Tank Boiler Design and Details; Water-Tube Boilers; Boilers—Construction and Detail; Boiler Mountings and Fittings; Fitting in of Machinery, Starting and Reversing Engines; Weight and Other Particulars of Machinery Relating Thereto; Effect of Weight—Inertia and Momentum—Balancing the Same; Materials Used by the Marine Engineer; Oil and Lubricants—Engine Friction; Tests and Trials, Their Objects and Methods; Appendices.

SEATON, A. E., and ROUNTHWAITE, H. M. *A Pocketbook of Marine Engineering Rules and Tables.* For the use of marine engineers and naval architects, designers, draughtsmen, superintendents, and all engaged in the design and construction of marine machinery, naval and mercantile. *Twelfth Edition, Revised and Enlarged.* Ill., 199 tables, $4\frac{1}{4} \times 6\frac{1}{2}$, leather, 733 pp. **\$5.00**

CONTENTS: Prime Movers on Shipboard; Engine Power Measurements; Efficiency of Marine Machinery; Propulsion of Ships and Resistance; Compound Engines; Steam Expanding; Piston Speeds and Revolution of Engines; Cylinders; Pistons; Piston Rods; Connecting Rods; Shafting; Thrust Shafts and Blocks; Stern-Tub Main Bearing of Crankshafts; Condensers; Air Pumps; Cool-

ing Water Pumps; Feed and Other Pumps; Bilge Pumps, Pipes and Other Fittings; Pump Levers and Gear; Slide Valves for Steam Distribution; Valve Gears; Reversing Gears for Valve Motions; Steam Turning Gears; Screw Propellers; Paddle-Wheel Propeller; Sea Valves for Water Supply; Steam Turbines; Internal Combustion Engines; Motor Boats; Superheated Steam; Skin Fitting and Valves; Results of Trials of Engine Wire Gauges; Copper Pipes; Wrought Iron Pipes; Copper Pipe Flanges and Fittings; Bronze and Cast Steel Pipes in General; Stop and Regulating Valves; Balancing Engines; Evaporators; Boiler Work; Boiler Mountings and Fittings; Furnace Fittings; Ladders and Platforms; Engine and Boiler Seatings; Lloyd's Rules; Steam Trawlers; Pumps for Bilges; Surveys of Machinery; Spare Gear; Composition, Properties, and Costs of Various Materials; Plates, Bars, etc.; Beams and Girders; Test Pressures; Effect of Temperature on Metals; Weights of Materials, Machinery, etc.; Water, Fresh and Salt; Oils and Lubricants; Friction; Conductivity of Metals; Fuel Consumption; Thermometers; Saturated Steam; Conversion and Mathematical Tables; Lloyd's and Other Corporation Rules and Regulations; Distances of Various Principal Ports.

SIMPSON, G. *The Naval Constructor.* A vade mecum of ship design, for students, naval architects, ship builders and owners, marine superintendents, engineers and draughtsmen. *Fourth Edition, Revised and Enlarged.* 386 ill., $4\frac{1}{2} \times 7$, flexible binding, 900 pp. **\$5.00**

CONTENTS: *Ship Calculations.* Displacement; Buoyancy; Trim; Metacenters; Stability; Gravity; Inertia; Preparation of Specifications; Freeboard; Freeboard Tables; Shelter Deckers; Kirk's Analysis; Launching; Transporting Cattle; Spectacle Frames; Strength of Ships; Resistance; Speed; Form. *Strength of Materials.* Stresses; Columns; Timber; Chains; Riveting. *Fittings and Details.* Structural; Keels; Rudders; Carriers; Framing; Floor; Tanks; Beams; Pillars; Hatch; Bulkheads; Strakes; Fitting Details; Anchors; Cranes; Hoops; Fairleads; Hawse; Rings; Shackles; Turnbuckles; Valves; Ventilation; Guns. *Rigging and Ropes.* Standing; Running; Derricks. *Equipment.* Boats; Slings; Tonnage. *Miscellaneous Tables.* Mathematical Tables Conveniently Arranged. The most complete and valuable treatise of its kind ever issued. Contains the result of wide practical experience both in America and England.

SOTHERN, J. W. M., and SOTHERN, R. M. *Simple Problems in Marine Engineering Design.* *Third Edition.* $5\frac{1}{4} \times 7\frac{3}{4}$, 202 pp. **\$3.00**

CONTENTS: Simple Mathematics; General Problems; Boiler Design; Engine Design; Speed, Consumption, and I. H. P. Marine Turbine Design. For this issue the section covering the general principles involved has been considerably enlarged and more carefully detailed by means of additional worked out examples, while the entire has been revised and corrected throughout.

THOMAS, J. BERTRAM. *The Strength of Ships.* 114 ill., 31 tables, $4\frac{1}{2} \times 7\frac{1}{4}$, 301 pp. **\$2.50**

CONTENTS: Materials of Construction and Their Properties; Shearing Forces and Bending Moments; Methods of Integration; Resistance of Beams to Flexure; Deflection of Beams; Fixed and Continuous Beams; Rectangular Plates Under Water Pressure; Shear Stresses in Beams; Strength of Struts; Longitudinal Strength of Ships; Transverse Strength of Ships; Riveted Joints in Ship-work; Effect of Rolling and Pitching on the Upper Structures; Rudder Calculations; Strength of Shaft-Brackets; Gun Supports; Tables.

WALKER, S. F. *Cold Storage, Heating and Ventilating on Board Ship.* ill., $5\frac{1}{2} \times 8$, fabrikoid, 275 pp. **\$2.50**

CONTENTS: COLD STORAGE. The Cold Storage Problem. Methods of Cooling the Cold Chambers. Methods of Cooling the Air. Leading the Cooled Air into the Cold Chambers. How the Low Temperature of the Brine or Refrigerant is Produced. The Condenser. Lubrication and Stuffing Boxes of Compressors.

Absorption Machines. Circulating Pumps. How Refrigerating Apparatus is Measured. Power Required for Refrigerating Apparatus. Cooling Water. Form of Apparatus for Use on Board Ship. Other Applications of Refrigeration on Board Ship. Cooling Magazines and Officers' and Men's Quarters. Faults. Heating Special Requirements on Board Ship. Difficulties. Methods of Heating Available. Hot Water, Steam, Air, Combined Air and Steam Radiator. The Thermotank System. The System Applied to the S.S. Lusitania. Heating by Electricity. Regulating Heat Delivered by Electric Heaters. VENTILATION. Ventilation by Heating and Cooling. Ventilation of Laboratories and Cattle Spaces. Fans. Size and Power Required. Testing Air Current. Estimating Heat Required. Apparatus Estimated to be Required for Heating the Different Saloons, State Cabins, etc. Cost of Furnishing Heat Required.

WHITE, HERBERT J. Oil Tank Steamers. Their working and pumping arrangements thoroughly explained. Ill., $5\frac{1}{2} \times 8\frac{1}{2}$, paper, 51 pp. **\$1.50**

CONTENTS: Arrangements of Tanks, Cofferdams, and Pump Rooms; Summer Tanks and Expansion Trunks; Pipe Lines, Valves and Cross Overs; Pumping Arrangements of the Summer Tanks; Pump Rooms and Their Valves; Water Ballasting and Shifting Ballast; Cleaning Tanks for Cargo; Different Kinds of Oil; Flash Point, Specific Gravity, Viscosity, and Its Effects; Measurement of Tanks, Taking Ullages, and Finding Quantities; Flexible Hoses and Their Connections.

NAVIGATION AND SEAMANSHIP

BRADFORD, GERSHOM. A Glossary of Navigation and Sea Terms. $5\frac{1}{4} \times 7\frac{3}{4}$, flexible fabrikoid, about 150 pp. (Van Nostrand's Nautical Manuals.) *In Press*

A dictionary explaining the words and phrases met with in the literature of the sea, together with accurate definitions of all terms in navigation and nautical astronomy. The illustrations have all been especially drawn for the work and materially help to a clear understanding of the text.

BRADFORD, GERSHOM. The Whys and Wherefores of Navigation. *Second Edition, Revised and Enlarged.* Ill., $5\frac{1}{4} \times 7\frac{3}{4}$, flexible fabrikoid, 210 pp. (Van Nostrand's Nautical Manuals.) **\$2.00**

CONTENTS: Dead Reckoning; Nautical Astronomy; Declination and Right Ascension, Including Precession; Time; Corrections for Observed Altitudes; Latitude; Azimuths and Amplitudes; Longitude; Sumner Lines and New Navigation; The Moon; Charts; Piloting; Appendix.

COFFIN, J. H. C. Navigation and Nautical Astronomy. Prepared originally for the use of the United States Naval Academy. *Eleventh Edition, Revised and Enlarged* by E. C. Collins. 61 ill., $5\frac{1}{4} \times 7\frac{3}{4}$, flexible fabrikoid, 267 pp. (Van Nostrand's Nautical Manuals.) **\$3.00**

CONTENTS: General Definitions; Navigational Instruments; Variations and Deviation of the Compass; Position Lines by Terrestrial Objects; The Sailings; Refraction; Time; The Nautical Almanac; Conversion of the Several Kinds of Time; Nautical Astronomy; Latitude; Chronometers; Sumner's Method; New Navigation; Celestial Bodies and Their Identification; The Tides; Appendix.

DRAPER, ERNEST G. Navigating the Ship. A series of lessons in elementary navigation based upon a course of lectures now in use at the Officers' Material School, Naval Auxiliary Reserve. Ill., $5\frac{1}{4} \times 7\frac{3}{4}$, 187 pp. **\$2.00**

CONTENTS: *Piloting.* The Compass; The Pelorus; Parallel Rulers, Dividers, The Lead, Sounding, Machine, and Leg; The Chart; The Sextant; Fixes; Angles by Bearings and Sextant. *Dead Reckoning.* Latitude and Longitude; A Day's

Work in Dead Reckoning; Examples in Dead Reckoning and Middle Latitude Sailing; Mercator Sailing; Great Circle Sailing—The Chronometer. *Celestial Navigation*. Definitions Relating to the Celestial Sphere; Time by the Sun—Solar Time, Mean Time, Conversion; Sidereal Time—Right Ascension; The Nautical Almanac; Correction of Observed Altitudes. *Navigation*. The Line of Position; Azimuths of the Sun; Marc St. Hilaire Method by a Sun Sight; Examples on Marc St. Hilaire Method by a Sun Sight; A Short Talk on the Planets and Stars—Identification of Stars; Latitude by Meridian Altitude of a Star—Latitude by Polaris (Pole or North Star); Marc St. Hilaire Method by a Star Sight; Longitude by Chronometer Sight of the Sun (Time Sight); Longitude by Chronometer Sight of a Star; Latitude by Ex-Meridian Altitude of the Sun; Examples; Latitude by Ex-Meridian Altitude of the Sun; Finding the Watch Time of Local Apparent Noon; Compass Error by an Azimuth; Correcting Longitude by a Factor; The Navigator's Routine—A Day's Work at Sea; Compass Adjustment; Appendix: Extracts from Nautical Almanac Necessary for Solution of Problems in the Book.

KNIGHT, AUSTIN M. *Modern Seamanship*. Unabridged reprint of *Seventh Edition*. 159 ill., $5\frac{1}{4} \times 7\frac{3}{4}$, flexible fabrikoid, 731 pp. (Van Nostrand's Nautical Manuals.) **\$3.00**

(Author is Rear Admiral in the United States Navy.)

CONTENTS: The Hull and Fittings of a Ship. Rope; Knotting and Splicing Mechanical Appliances on Shipboard. Blocks and Tackles. Handling Heavy Weights. Compass. Log and Lead. Submarine Signals. Boats. Handling Boats in a Surf. Ground Tackle. Carrying Out Anchors. The Steering of Steamers. The Rules of the Road. Manœuvring to Avoid Collision. Piloting. Handling a Steamer alongside a Dock. Placing a Ship in Dry Dock. Weather and the Laws of Storms. Handling Steamers in Heavy Weather. The Handling of Torpedo Vessels. Keeping Stations and Manœuvring in Squadron. Towing. Rescuing the Crew of a Wreck. Man Overboard. Stranding. Hints for Junior Officers Doing Line Duty. Appendix.

This book is the best American work on seamanship, naval and merchant service. The chapters on ship handling and the higher problems of seamanship are exceptionally good. It is now produced in pocket size at less than half the price of the original book.

LECKY, S. T. S. *Wrinkles in Practical Navigation*. Authorized facsimile of the *Eighteenth Edition, Revised and Enlarged* by William Allingham. 136 ill., $5\frac{3}{4} \times 8\frac{1}{2}$, flexible fabrikoid, 846 pp. **\$5.00**

CONTENTS: Books and Instruments; Mile and Knot; Compass; Marine Chronometer; Sextant; Horizons; Charts; Parallel Ruler; Dividers; Pelorus; Azimuth; Station Pointer; Sounding Machines; Binocular and Telescope; Lord Kelvin's Instruments; Barometers; Ocean Meteorology; Tides, Currents, Waves and Breakers; Fog and Floating Ice; Sky Pilotage; Latitude by Various Methods; Time; Lecky's A B C Tables; Longitude; Sumner Lines; Double Altitudes; Simultaneous Altitudes; Corrections for Errors; New Meteorological Measures for Old; Compass Adjustment; Shaping the Course; Danger Angle; Distance from Land; Composition and Resolution of Forces and Velocities.

RIESENBERG, FELIX. *Standard Seamanship For the Merchant Marine*. Ill., $5\frac{1}{4} \times 7\frac{3}{4}$, flexible fabrikoid, about 600 pp. (Van Nostrand's Nautical Manuals.) **In Press**

CONTENTS: Types of Vessels—Steam; Construction Details; Holds, Peaks, Tanks; Deck Machinery; Cargo Gear; Stowage; Carriage of Cattle and Horses; Passengers; Boats and Boat Handling; Station Bills and Drills; Preparing for Sea; Compass, Log, Lead; The Bridge; Signals of the Sea; Rules of the Road; Customs of the Sea; Ground Tackle; Handling a Steamer; Accidents and Disasters; Safety at Sea; Tank Steamers; Types of Sailing Vessels; Knotting and Splicing; Rigging; Sails, Awnings, Tarpaulins; Handling a Sailor; The Weather; Ship's Business; Ship Maintenance; Stores Lists; Cost Data; Docks and Terminals.

RIESENBERG, FELIX. *The Men on Deck.* Master, mates and crew; their duties and responsibilities. A manual for the American merchant service. $5\frac{1}{4} \times 7\frac{3}{4}$, flexible fabrikoid, 339 pp. (Van Nostrand's Nautical Manuals.) **\$3.00**

CONTENTS: The Master; Laws Effecting the Duties of the Master; Entry and Clearance; Entry of Merchandise; Liability of Owners, Masters and Shippers; The Chief Mate; Rules of the United States Supervising Inspectors Relating to Lifesaving; Passenger Act of 1882; The Second Mate; The Third Mate; The Junior Officers; Cadets; Laws Defining Officers of the Merchant Marine; Examination for Licenses, Master and Mates; The Watch Officer; The Rules of the Road—International—Inland; The Limits of United States Inland Waters; The Quartermasters; The Carpenter; The Boatswain; Able Seamen; United States Navigation Laws Relating to Merchant Seamen; Discipline at Sea; The Sea Library.

Points out the things the various members of the deck department of an ocean steam vessel may reasonably be expected to know, and the things they may be required to do. The book does not pretend to tell how, but the object is to show what a modern American seaman ought to know and to do.

RUST, A. *Practical Tables For Navigators and Aviators.* Containing new and rapid methods for finding the longitude, azimuth and latitude, and for great circle sailing, the identification of stars, and for plotting line of position by the Sumner and Marcq Saint-Hilaire methods, 3 folding plates, $6\frac{1}{4} \times 9\frac{1}{2}$, 116 pp. **\$3.50**

These tables have been prepared with a view to giving navigators and aviators some new methods for finding the longitude, azimuth and latitude quickly and accurately, and for solving other important problems in navigation with the least possible number of figures. The methods used are founded mainly upon original formulas deduced by the author.

SEAMANSHIP, Lectures on. By the Department of Seamanship, Officers' Material School, Naval Auxiliary Reserve, Pelham Bay Park, N. Y. $5\frac{1}{4} \times 7\frac{3}{4}$, 240 pp. **\$2.00**

CONTENTS: Rules of the Road; Construction of a Ship; Care and Preservation of a Ship; Ground Tackle, Steering Gear, Deck Fittings; Boats, Gear, and Life-saving Equipment; Bridge and Navigating Appliances; Handling a Ship (Mooring); Stowage of Cargo; Weather and the Law of Storms; Ship Organization (Methods); Duties of the Officer of the Deck; General Duties of Junior Officers; Glossary.

SEARLE, G. M. *Sumner's Method for Finding a Ship's Position, Improved and Abbreviated.* Ill., $3\frac{3}{4} \times 6$, boards, 51 pp. (Van Nostrand's Science Series.) **\$0.75**

The method of solution of the Sumner problem proposed in this book is believed to be better than those usually followed, in not requiring the use of a chart or diagram of any kind, but simply a small sheet of paper and the ordinary five-place logarithm tables. Nothing else is needed for an observer at a fixed point to obtain an accurate latitude and longitude but a chronometer, the error and rate of which is known, and a nautical almanac, with two observed altitudes of the sun or other celestial body. For a ship at sea—the usual case—slight corrections are needed to one of the altitudes, to allow for the change of the ship's place, and the change of the declination of the sun, or other observed body, in the interval between the observations. These corrections require an assumed value of the latitude and of the longitude of the observer, or a measured azimuth of the body observed, instead of the latter. Even if errors are made in the assumptions the final results would not be materially affected. The proof of the formulas used is given at some length; but it is not necessary to study this in order to use them. The practical ones are all together in a small space, and illustrated by numerical examples, and a proposed form for the computation.

TODD, J., and WHALL, W. B. *Practical Seamanship for Use in the Merchant Service. Fifth Edition.* 247 ill., $6\frac{1}{2} \times 9\frac{3}{4}$, 385 pp. **\$12.00**

CONTENTS: Principal Parts of a Ship; Principal Spars and Rigging; Ropes, Knots, Bends, Hitches and Splices; Blocks, Gins and Tackles; The Common Lead Lines; The Log; Action of Wheel on the Rudder; The Hull; Anchors and Cables; Taking in and Sending Aloft the Various Masts; Handling The Sails; Sailing Ships Getting Under Weight and Anchoring; Accidents to Spars; Leaks; Fire; Man Overboard; Raft; At Single Anchor in Tideway; Cutting Rigging; Sail-making; Lights and Fog Signals; Boats; Stowage; Nautical Terms; The Steamship Officers' Duties; In Narrow Waters; Taking Bar Harbors in Heavy Weather; Handling Steamers in Heavy Weather; Collision; Saving a Shipwrecked Crew; Common Pilotage and Coasting Seamanship; Stranded; Heaving Down; Displacement; Winds; Weather and Barometers; Coating the Bottom of Steamers; The International Signal Code; To Measure a Hold.

MARINE STEAM ENGINEERING

HOVENDEN, F. *Practical Mathematics for Young Engineers.* Specially arranged for the use of apprentices who intend to become marine engineers. Ill., $5\frac{1}{4} \times 7\frac{3}{4}$, 144 pp. **\$1.50**

Explains clearly the rules, and limits the applications of arithmetic to the requirements of the practical draughtsman or mechanic. Many of the examples in the sections on Mensuration and Mechanics are taken from the Board of Trade examination papers. New demonstrations of some of these are given.

MARTIN, W. D. *Hints to Engineers for the Board of Trade Examinations. Third Edition.* Ill., $5 \times 7\frac{1}{4}$, 141 pp. **\$2.00**

CONTENTS: Boilers; Boiler Defects; Breakdowns; Chemistry and Gases; Dates of Inventions; Density and Scale; Engines; Electricity; Evaporators; Fuel and Combustion; Gauge Cocks; Gauges; General Questions; Heat; Indicator Cards; Length of Parts; Metals; Oil Motors; Oscillating Engines; Propellers; Pumps; Refrigeration; Safety Valves; Shaft; Slide Valves; Temperatures; Turbines.

This new edition contains over eight hundred questions and answers similar to those usually asked in the Board of Trade oral examination.

McGIBBON, W. C. *Marine Engineers' Pocketbook.* Mechanics, Heat, Strength of Materials, including Electricity, Refrigeration, Turbines, Oil Engines. Ill., $4\frac{1}{4} \times 6\frac{1}{2}$, 476 pp. **\$4.50**

CONTENTS: Barometers; Beams; Board of Trade Regulations; Corrosion in Boilers; Types of Boilers; Bunker Capacity; Piston Clearance; Combustion of Coal; Condensation of Steam; Indicator Diagrams; Displacement of Ships; Electricity; Oil Engines; Expansion of Steam; Forces; Transposition of Formulæ; Heat; Kinetics; Levers; Strength of Materials; Mensurations; Paddle Wheels; Paints; Steam Pipes; Propellers; Propulsion; Pulleys; Pumps; Refrigeration; Boiler Rules; Safety Valves; Screw Jack; Shafts; Slide Valves; Tables; Turbines; Seamen's Wages; Work.

A useful pocketbook in simple terms, giving rules and tables that sea-going engineers find necessary. In all cases the solution of problems is shown without the use of advanced mathematics.

McGIBBON, W. C. *Marine Engineers' Drawing Book for Board of Trade Examinations. Seventh Edition.* 59 plates and tables. $12\frac{1}{4} \times 9\frac{3}{4}$, flexible cloth, 137 pp. **\$2.50**

CONTENTS: Examination in Rough Working Drawing for a First Class Engineer's Certificate of Competency; A Few Hints for Beginners; Proportion of Parts; Area of Ports and Pipes; Stresses on Working Parts; Cylindrical Ves-

sels; Useful Notes for Engineers. 59 plates with full instructions covering every piece of machinery on board ship. Tables.

This work is a series of plates on machine design, pertaining to marine machinery, giving instructions for drawing the various parts. The author believes that by giving the proportion of one part to another rather than the dimensions of all parts, the true form of the machine can better be impressed on the mind, and in all the plates only a few, easily remembered, dimensions are given and other measurements are omitted.

McGIBBON, W. C. *Indicator Diagrams for Marine Engineers.* 197 ill., $7\frac{3}{4} \times 9\frac{3}{4}$, 196 pp. **\$3.50**

CONTENTS: Origin of the Indicator; Diagrams of Work; How to Take Off a Diagram from a Marine Engine; General Definition of Points, etc.; Pressure Considered; Laws Relating to Pressure and Volume; Steam Expanded in Compound Engines; Effect Produced on Diagrams Due to Sequence of Cranks; Zeuner's Valve Diagrams; To Work Out Horse-Power; To Balance an Engine; Formation of Loops and Diagrams; Diagrams from Auxiliary Engines; Trial Trip Indicator Diagrams, etc.; Defective Diagrams; Miscellaneous Diagrams.

REED'S Engineers' Handbook to Board Examinations for certificates of competency as first and second class engineers. By W. H. Thorn. *Nineteenth Edition, Revised and Enlarged.* 402 ill., 38 plates, $6 \times 8\frac{3}{4}$, 811 pp. **\$9.00**

CONTENTS: Arithmetic, Algebraic Signs; Areas; Weight of Parts; Consumption; Horse Power; Safety Valves; Counters; Thrust Problems; Temperature; Boilers; Salt Problems; Simple Machines; Stress; Friction; Indicator Diagrams; Marine Oil Motors; Questions and Answers.

KEY to the Nineteenth Edition of Reed's Engineers' Handbook to the Board of Trade examination for first and second class engineers, and containing the workings of all the questions given in the examination papers. By W. H. Thorn & Son. $6 \times 8\frac{1}{2}$ 398 pp. **\$4.00**

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Attempts to teach the groundwork of applied mechanics by a purely arithmetical treatment.

SOTHERN, J. W. M. *"Verbal" Notes and Sketches For Marine Engineers.* A manual of marine engineering practice. Intended for the use of naval and mercantile engineer officers of all grades, and students, and is specially compiled for the use of engineer officers preparing for examinations of competency at home or abroad. *Tenth Edition, Greatly*

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TOD, JOHN, and McGIBBON, W. C. Marine Engineers' Board of Trade Examinations. Containing all the latest elementary questions with answers, including notes on verbals. As used in the Board of Trade Examinations, 1913. *Eighth Enlarged Edition.* 288 ill., 4 plates, $5\frac{1}{4} \times 8$, 390 pp. **\$2.00**

This new edition has been entirely reset, in order to bring it up to date. The sections on Steam Turbines and Oil Motors have received especially careful attention and contain much new matter.

MILITARY

BARNES, JOHN B. Elements of Military Sketching and Map Reading. *Fourth Edition, Revised.* Ill., $4\frac{1}{2} \times 5\frac{3}{4}$, 120 pp. **\$0.75**

CONTENTS: Sketches; Scales; Construction of Scales; Conventional Signs, Abbreviations; Sketching Implements; Orientation, Resection Intersection; Contours, Map Distances, Vertical Interval; Road Sketching Position, Sketching, Landscape Sketching, Map Reading.

Bayonet Training. Compiled from British Training Manual, 1916. Ill., $3\frac{5}{8} \times 5\frac{1}{8}$, 60 pp. **\$0.30**

Training in the use of the bayonet is receiving much attention from all the combatant nations in Europe. The aim of the instruction is twofold: 1. To develop great alertness of mind, readiness of muscle, and habit of quick obedience to command. 2. To develop fighting spirit. Physical drill and bayonet training go hand in hand and their drill periods follow each other. The physical drill consists of calisthenic exercises for fifteen or twenty minutes, followed by some game or exercise requiring great quickness of movement. The material in this book is from the latest British Training Manual (1916), which is based on their experience, and the forces are now being trained in accordance therewith.

BUNKLEY, J. W. Military and Naval Recognition Book. A handbook on the organization, insignia of rank and customs of the service of the world's important armies and navies. *Second Edition, Revised and Enlarged.* 60 full page plates, 18 in colors, 5×7 , 279 pp. **\$1.00**

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LAFFARGUE, ANDRE. *The Attack in Trench Warfare.* Translated by an officer of infantry. Ill., 5 folding plates, $3\frac{1}{2} \times 5\frac{1}{2}$, 135 pp. **\$0.50**

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The methods of training of infantry units for trench warfare and the degree of careful preparation necessary for the attainment of any measure of success are among the most important features of Captain Laffargue's study. This study was so highly thought of by General Joffre that he caused it to be published to the French Army before it was given out for general publication, which speaks for its excellence more than any other commendation which could be bestowed upon it. Written in conversational styles, it makes interesting reading for the layman.

MERTENS, COLONEL. *Tactics and Technique of River Crossings.* Translated from the German by Major Walter Krueger, Assistant Chief of Staff, 84th Division, National Army. 105 ill. and 4 maps, 6×9 , 300 pp. **\$3.00**

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Presents a carefully thought out scheme of a way in which river crossings may be effected and of how the attacker, once across, may be met.

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RAUSENBERGER, F. *The Theory of the Recoil of Guns With Recoil Cylinders.* Translated by Alfred Slater. 3 folding plates, 6×9 , 124 pp. **\$5.00**

CONTENTS: General; The External Forces on a Recoiling-Gun Mounting Which Comes into Action on Firing; Determination of the Brake Pressure and the Length of Recoil; The Running Forward Device; Recoil Brakes; The Running Forward Brake.

DRAWING

MECHANICAL DRAWING—MACHINE DESIGN

ADLER, A. A. *The Theory of Engineering Drawing. Second Edition, Revised.* 273 ill., 6 x 9, 330 pp. **\$2.50**

(Author is assistant professor of mechanical drawing and design in the Brooklyn Polytechnic Institute.)

CONTENTS: *The Principles of Parallel Projecting-Line Drawing.* Nature of Drawing; Science and Art; Magnitude of Objects; Commercial Application of Drawing; Oblique Projection; Orthographic Projection; Axonometric Projection. *Geometrical Problems in Orthographic Projection.* Representation of Lines and Points; Representation of Planes; Elementary Considerations of Lines and Planes; Problems Involving the Point, Line and Plane; Classification of Lines, of Surfaces; Intersection of Surfaces by Planes, and Their Development; Intersections of Surfaces with Each Other and Their Development. *The Principles of Convergent Projecting-Line Drawing.* Perspective Projection. *Pictorial Effects of Illumination.* Pictorial Effects of Illumination in Orthographic Projection, and in Perspective Projection.

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ADLER, A. A. *The Principles of Parallel Projecting-Line Drawing.* Part I. of *The Theory of Engineering Drawing.* 48 ill., 6 x 9¼, 75 pp. **\$1.25**

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COLLINS, CHAS. D. *Drafting Room Methods, Standards and Forms.* A reference book for engineering offices and draftsmen. Ill., 6 x 9, 150 pp. **\$2.00**

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CATHCART, W. L. Machine Design. Part I., Fastenings. 119 ill., $6\frac{1}{4} \times 9\frac{1}{2}$, 303 pp. **\$3.00**

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HALL, W. S. Descriptive Geometry, with Numerous Problems and Practical Applications. Comprising an 8vo volume of 76 pages of text and a 4to atlas of 31 plates. Two volumes. $6 \times 9\frac{1}{4}$, 81 pp. **\$4.00**

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INNES, C. H. Problems in Machine Design. For the use of students, draughtsmen and others. *Second Edition.* 201 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, cloth, 266 pp. **\$3.00**

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(Author is professor of mechanical drawing, School of Applied Industries, Carnegie Institute of Technology.)

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LEEDS, CHARLES C. Mechanical Drawing for Industrial and High Schools.

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MINERALOGY, MINING, METALLURGY

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(Authors are respectively Prof. of Mineralogy, Columbia University, N. Y. City, and Chief Chemist, United States Bureau of Mines.)

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CONTENTS: Extent of the Goldfields; Geological Conditions; Characteristics of the Reef; Records of Existing Deep-level Companies; Dimensions of Properties; Location of Deep-level Shafts and Boring for Reef Horizon; Surveying Shafts; Development; Engineering Problems; Financial Problems; Expenditure; Forecast of Position of Deep-level Mines in 1906; Valuation of Mines; Probable Economies to be Effected.

TINNEY, W. H. *Gold Mining Machinery: Its Selection, Arrangement and Installation.* A practical handbook for the use of mine managers and engineers. 97 ill., $6\frac{1}{2} \times 9\frac{1}{4}$, 320 pp. **\$3.00**

CONTENTS: Motive Power; Engine Erecting; Boilers; Chimneys; Fuel; Feed; Management of Motive Power; Pumping Machinery; Winding Machinery; Air Compressors; Rock Drills; Crushing Machinery; Concentrating and Gold Extracting Plant; Transmission of Power; Transport; Piping and Joints; Construction; Tackle and Tools; Details for Estimates.

COAL AND COAL MINING

COSGROVE, JAMES F. *Coal. Its Economical and Smokeless Combustion.* 33 ill., $5\frac{1}{2} \times 8\frac{1}{2}$, 283 pp. **\$3.50**

CONTENTS: Classification of Coals; Characteristics of Coal; Coal Classed According to Use; Composition of Coal; Effect of Size of Coal; Clinkering of Coal Ash; Prevention of Clinker; Geological History of Coal; The Coal Fields of America; Analysis of Coal; Purchasing of Coal; Theory of Combustion; Combustion of Coal; Temperature of Combustion; Determining the Heat Value of Coal; Burning Bituminous Coal; Smoke and its Prevention; Burning Coal Smokelessly; Draft Regulation; Hand-Fired Furnaces; Stoker Furnaces.

GARFORTH, W. E. *Suggested Rules for Recovering Coal Mines After Explosions and Fires.* 4 folding plates, $5 \times 7\frac{1}{4}$, leather, 71 pp. **\$1.50**

CONTENTS: Introduction Showing the Necessity for Formulating Rules. Suggested Rules to be Taken BEFORE an ACCIDENT. Appointment of Emergency Officials, Ambulance Stores, Food, etc. Preparation of Mechanical and Other Special Appliances, Safety and Electric Lamps, etc. Ventilation, Fan-drift,

Separation Doors, etc. Sections and Plans of Shafts and Underground Workings for the Use of Explorers. Instructions to Workmen, Need of Special Knowledge and Training for Rescue Work and Suggestions Should Men be Entombed. Equipment of Rescue Stations and Requirements of Portable Breathing Apparatus. Danger Attending use of Apparatus with Untrained Men. Suggested Rules for Guidance AFTER an ACCIDENT. Emergency Officials and Restoratives, etc. Winding and Ventilation Arrangements, etc. Rules for Guidance of Exploration Parties, etc. Special Rules in the Use of Rescue Apparatus. Suggestions Relating to the Restoration of Ventilation. Treatment of Survivors. Scientific Aids. Provision for the Conveyance of Corpses. Disposal of the Carcases of Dead Horses. Disinfectants and Precautions taken to Prevent Blood-poisoning. Information Required for Special Enquiry. Restoration on Alteration of Roadways for the Resumption of Work. Conclusion.

MERIVALE, J. H. *Notes and Formulae for Mining Students. Fourth Edition*, revised and enlarged by H. F. Bulman. $4\frac{3}{4} \times 6\frac{3}{4}$, 188 pp. \$1.00

PAMELY, C. *Colliery Manager's Handbook*. A comprehensive treatise on the laying-out and working of collieries, designed as a book of reference for colliery managers and for the use of coal-mining students preparing for first-class certificates. *Fifth Edition, Revised and Enlarged*. 1,000 ill., 7×10 , 1208 pp. \$10.00

CONTENTS: Geology; Search for Coal; Mineral Leases and other Holdings; Shaft Sinking; Surface Arrangements; Timbering and Walling; Narrow Work and Methods of Working; Surface Railways and Underground Conveyances; Drainage; Ventilation; Priestman Oil Engine; Petroleum and Natural Gas; Surveying; Lamps; Lighting; Coal Cutting Machinery; Colliery Explosions; Incidental Operations and Appliances.

VIRGIN, ROBT. Z. *Coal Mine Management*.

In Press

WALSH, JOSEPH J. *Physics and Chemistry of Mining and Mine Ventilation*.

A practical handbook for vocational schools and for those qualifying for mine foreman and mine inspector certificates. *Second Edition, Revised and Enlarged*. Ill., $5\frac{1}{2} \times 8$, 232 pp. \$2.50

CONTENTS: Matter; Motion; Velocity and Force; Gravitation; Liquids and Liquid Pressure; Heat; Gases; Barometer; Gases; Specific Heat; Air Analysis; Mine Ventilation; Formulas; Mine Fires.

Deals fully with the fundamental theories and laws of ventilation, covering the subject with sufficient completeness to meet the needs of the mine foreman or inspector and furnishes the student with a suggestive method of study in graphic form. All of the excellent features which have made the book so useful for those studying to qualify for better position have been retained and improved.

PETROLEUM

THOMPSON, A. B. *Oil Fields of Russia and the Russian Petroleum Industry*.

A practical handbook. 93 ill., numerous plates, 8×11 , 522 pp. \$10.00

CONTENTS: Composition and Special Features of the Oil Deposits; Distribution of Oil Throughout the Strata; Origin of Petroleum in the Caucasus; Phenomena Attending its Distribution; Statistics; Boring for Oil; Casing of Wells; Exclusion of Water from Oil Wells; Methods of Raising Oil; Air Lift System of Oil Rais-

ing; Baling Wells; Fountains; Generation of Steam; Theory and Practice of Liquid Fuel; Fires on the Oil Fields; Administration of Oil Properties; Notes on the Treatment of Belts and Wire Rope; Useful Data and Figures.

THOMPSON, A. B. *Oil Field Development and Petroleum Mining.* A practical guide to the exploration of petroleum lands, and a study of the engineering problems connected with the winning of petroleum. 155 ill., 8 colored maps, 6 x 9, 700 pp. **\$10.00**

CONTENTS: Introductory; Customs, Leasing and Valuation of Oil-Fields; Geological Structure and Lithological Character of Oil-Fields, and Factors Governing the Distribution of Petroleum; Indications of Petroleum and Phenomena Associated with Its Occurrence; Typical Oil-Field Structures; Origin, Composition, Characteristics, and Treatment of Petroleum; Systems of Drilling or Boring for Petroleum; Casing or Lining Tubes for Wells and Appliances Employed in Its Insertion, Manipulation, Extraction, and Repairs; Exclusion of Water from Oil Wells; The Extraction of Petroleum and Natural Gas; Oil-Field Equipment; The Measurement, Collection, Transmission, and Utilization of Natural Gas; Compilation of Statistical Records; Oil-Field Organization and Accounts.

The author's aim has been to put in unpretentious language and concise form the main principles of an industry bristling in unsolved problems and encompassed by far-reaching possibilities, presenting unbounded opportunities for enterprising engineers of education and initiative. The author is not an arm-chair critic, but a clear observer who has had some twenty years' practical and uninterrupted experience in oil fields in all parts of the world. The information contained in this volume is based on an intimate knowledge of many widely separated oil fields accumulated during years of extensive travelling. The work contains a vast amount of useful data conveniently tabulated and arranged and it is full of hints and suggestions of use to oil field operators. Eight colored maps showing the distribution of the oil fields of the world are among the hundreds of excellent illustrations contained in this work.

Metallurgy

RIDEAL, E. K. *The Rare Earths and Metals.* 5½ x 8¾. (Industrial Chemistry Series.) *In Press*

ROSENHAIN, WALTER. *An Introduction to the Study of Physical Metallurgy.* 140 ill., 6 x 9, 375 pp. (Metallurgy Series.) **\$4.00**

CONTENTS: *Introductory. Structure and Constitution of Metals and Alloys.* Microscopic Examination of Metals; The Metallurgical Microscope; The Microstructure of Pure Metals and of Alloys; Thermal Study of Alloys; The Constitutional Diagram and the Physical Properties of Alloys; Typical Alloy Systems; The Iron-Carbon System. *The Properties of Metals as Related to Their Structure and Constitution.* Mechanical Testing of Metals; Effect of Strain on the Structure of Metals; Thermal Treatment of Metals; Mechanical Treatment of Metals, including Casting; Defects and Failures in Metals and Alloys.

A brief study, largely from the point of view of the internal structure of metals. Throughout the book more attention is given to the principles underlying the various operations and the laws which govern them than to the detailed description of apparatus or of experimental methods. This work should serve not only as an introduction to the subject of the chemistry and physics of metallurgy, but also as an introduction to the "Metallurgy Series" edited by the author of this, the first volume.

METALLURGICAL ANALYSIS

PARK, JAMES. Laboratory Instructions in Assaying and Practical Chemistry. *Second Edition.* $5\frac{3}{4} \times 8\frac{1}{2}$, 203 pp. \$3.50

CONTENTS: Practical Assaying; Principles of Qualitative Analysis; Quantitative Analysis of Simple and Complex Substances; Volumetric Analysis Tables.

PLATTNER'S Manual of Qualitative and Quantitative Analysis with the Blowpipe. Translated by Henry B. Cornwall, assisted by John H. Caswell. From the sixth German edition, by Prof. Friederich Kolbeck. *Eighth Edition, Revised.* 87 ill., $6\frac{1}{4} \times 9\frac{1}{4}$, 463 pp. \$4.00

CONTENTS: Apparatus and Reagents. *Qualitative Blowpipe Analysis.* General Rules; Examination of Minerals, Ores and Metallurgical Products for Metallic and Non-Metallic Bodies; Examples Showing the Method of Detecting the Constituents of Various Compounds. *Quantitative Blowpipe Assays.* Preparation of Substances; Detailed Description of Assays of Silver; Gold; Copper; Lead; Bismuth; Tin; Cobalt and Nickel; Mercury and Their Alloys.

WHITE, CHARLES H. Methods in Metallurgical Analysis. 106 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 364 pp. \$2.50

(Author is assistant professor in mining and metallurgy in Harvard University and in the Massachusetts Institute of Technology.)

CONTENTS: Definition of the Subject; Sampling; Necessity for Correct Sampling; The Operations of Analysis, Gravimetric, Volumetric Analysis; Calorimetry; Methods of Analysis in the Metallurgy of Iron and Steel; Moisture; Hygroscopic Water; Combined Water; Loss on Ignition; Iron in Ores; Silica, Sulphur, Phosphorous, Alumina, Manganese, Lime, Magnesia and Titanium in Ore; Analysis of: Iron and Steel; Iron Slags; Limestone; Methods of Analysis in the Metallurgy of Copper, Lead, etc.; Copper, Lead, Zinc and Arsenic in Ore; Analysis of: Copper Matte; Chilled Blast Furnace Slags; Reverberatory Slags; Briquettes and other Copper Bearing Products; Copper Bullion; Alloys; Methods of Analysis in the Production of the Precious Metals; Analysis of Fluxes; Analysis of Fuels; Analysis of Clay; Methods for the Determination of Some of the Minor Metals; Methods for the Determination of Some of the Rarer Metals; Testing of Lubricating Oils; Examination of Boiler Water; Detection of the Metals; Tables; General References.

In this volume are brought together those methods in metallurgical analysis which, owing to their fitness, seem to have been most generally adopted in American metallurgical laboratories. The procedures are given for the sake of clearness in as direct statement as possible without regard to literary style.

IRON AND STEEL

(See also "Electrometallurgy")

DICHMANN, CARL. The Basic Open-Hearth Steel Process. Translated by Alleyne Reynolds. Ill., $6\frac{1}{4} \times 9\frac{1}{4}$, 340 pp. \$4.00

CONTENTS: Physical Conditions in an Open-Hearth Furnace System; General Remarks on Producer Gas; Raw Materials for Producer Working; Reactions on Gasification in the Producer, Stoichiometric Relations; Thermal Conditions for Gasification of Carbon; Influence of the Individual Reactions on the Temperature of Reaction; Distillation and Producer Gas; Judgment of the Working of Producer from Analysis of the Gas; Gas and Air on Their Way Through the Furnace System; CHEMISTRY OF THE BASIC OPEN-HEARTH PROCESS; Reducing and Oxidizing Processes; Valuation of the Phosphorus Content of the Pig Iron; Comparison between the Basic Open-Hearth Process and the Pneumatic Refining Process.

HUDSON, O. F. **Iron and Steel.** An introductory text-book for engineers and metallurgists. With a section on Corrosion by Guy D. Bengough. (Outlines of Industrial Chemistry.) 47 ill., $6 \times 9\frac{1}{4}$, 184 pp. **\$2.50**

CONTENTS: Mechanical Testing. Smelting of Iron Ores. Properties of Cast Iron. Foundry Practice. Mixing Cast Iron for Foundry Work. Malleable Cast Iron. Wrought Iron. **MANUFACTURE OF STEEL.** Cementation Process. Crucible Steel. Bessemer Process. Open Hearth Process. Electric Furnaces. Mechanical Treatment of Steel. Reheating. Impurities in Steel. Constitution of Iron Carbon Alloys. Heat Treatment of Steel. Special Steels. Steel Castings. Case Hardening. Welding. The Corrosion of Steel and Iron.

Presents briefly the more important principles of the metallurgy of iron and steel. Practical details of methods of production have been avoided in order that such matters as the constitution of steel and cast iron, and the effect of mechanical and heat treatment on the properties of these alloys might be adequately considered. The corrosion of iron and steel has been fully dealt with in a specially contributed section.

JÜPTNER, H. F. V. **Siderology: The Science of Iron.** (The Constitution of Iron Alloys and Iron.) Translated from the German by Charles Salter. Ill., $5\frac{3}{4} \times 8\frac{3}{4}$, cloth, 352 pp. **\$5.00**

CONTENTS: Introduction; The Theory of Solution; Micrography; Chemical Composition of the Alloys of Iron; Chemical Composition of Slag.

KERSHAW, J. B. C. **Electro-Thermal Methods of Iron and Steel Production.** With an introduction by Dr. J. A. Fleming, F.R.S. 50 tables, 92 ill., $5\frac{1}{2} \times 8\frac{1}{4}$, 262 pp. **\$3.00**

CONTENTS: General Review of Progress in Period 1907-1912; General Principles of Electric Heating and Classification of Furnaces; Notes on Electrodes and Refractory Materials for Linings; Electric Smelting Furnaces; Electric Steel-Refining Furnaces: The Heroult, The Giord, The Stassano, The Kjellm and Röchling-Rodenhauser, The Keller; Other Types of Electric Furnace for Refining Steel; Comparative Power Consumption and Working Costs; Lists of Furnaces for Iron and Steel Production in Operation or Under Construction in 1912; Patents Granted Between 1898 and 1911; Abstracts and Reprints of Earlier Patents; Abstracts of Papers and Notes on Electric Steel Refining.

MARKS, E. C. R. **Manufacture of Iron and Steel Tubes.** *Second Edition, Enlarged.* 133 ill., $5 \times 7\frac{1}{2}$. **\$2.50**

A summary of the efforts and achievements of inventors based on their patent specifications as filed in the British Patent Office, so arranged as to be of some practical utility to manufacturers and others interested in iron and steel tubes.

SELLEW, WILLIAM H. **Steel Rails, Their History, Properties, Strength and Manufacture.** With notes on the principles of rolling stock and track design. 361 ill., 35 folding plates, $7\frac{3}{4} \times 10\frac{3}{4}$, 575 pp. **\$10.00**
(Author is principal assistant engineer, Michigan Central Railroad.)

ABRIDGED CONTENTS: Development of the Present Section; Pressure of the Wheel on the Rail; Supports of the Rail; Stresses in the Rail; Strength of the Rail; Influence of Detail of Manufacture; Rail Specifications.
(For detailed table of contents see page 98.)

SEXTON, A. H., and PRIMROSE, J. S. G. **An Outline of the Metallurgy of Iron and Steel.** *Second Edition.* 271 ill., $6 \times 8\frac{3}{4}$, 587 pp. **\$6.50**

CONTENTS: Iron; Pig Iron; Preparation of Materials for the Smelter;

Chemistry of the Blast Furnace; Thermal Phenomena of the Blast Furnace; The Blast Furnace; Accessories; Air Supply; The Hot Blast; Blast Furnace Slag; Calculating Charges; Blast Furnace Practice; Utilization of By-Products; Historical; The Foundry; *Malleable Iron*; Properties; Puddling; Other Methods of Preparing; The Forge and the Mill; *Steel*; Production Direct from the Ore and from Malleable Iron; Production by Partial Decarburization of Pig Iron; The Bessemer Process; Chemistry of the Bessemer Process; Thermal Phenomena of the Bessemer Blow; Working of the Bessemer Process; Bessemer Plant; Basic Bessemer Process and Plant; Modifications; Historical Notes on the Bessemer Process; The Siemens or Open-Hearth Process and Plant; Basic-Open-Hearth Process; Modifications of the Open-Hearth Process; Appliances Applicable to all Processes; Working and Casting Mild Steel; After-Treatment of Iron and Steel; Alloy Steels; Testing Iron and Steel; Rusting and Protection of Iron and Steel; Microstructure of Iron and Steel; Heat Treatment of Iron and Steel; Appendix.

STANSBIE, J. H. *Iron and Steel*. 86 ill., 6 x 8½, 389 pp. (Van Nostrand's Westminster Series.) **\$2.50**

CONTENTS: Iron Ores; Combustible and Other Materials Used in Manufacture; Primitive Methods of Production; Pig Iron and its Manufacture; Refining in Small Charges; Crucible and Weld Steel; Bessemer Process; Open-Hearth Process; Mechanical Treatment of Iron and Steel; Physical and Mechanical Properties; Iron and Steel Under the Microscope; Heat Treatment; Electric Smelting; Special Steels; Glossary.

STEVENSON, J. L. *Blast Furnace Calculations*. Ill., 5½ x 7½, leather, 160 pp. **\$2.50**

CONTENTS: Analyses of Coke, and Ores; Size of Furnace Required; To Find Working Capacity; Burden Capacity; Calculations of Cubical Contents of 18' x 80' Furnace; Volume by Method of Conical Frustra; Burden Capacity per Ton of Iron; Commencing the Designing; Furnace Bosh; Furnace Height; Hearth; Slag Tuyere; Tuyeres; Stove Power and Heating Surface; Air Capacity Required; Changes in Temperature; Summary of Power Required for any Output per Furnace per Day; Section of 260 Tons Furnace; Pig Iron; Analyses for Comparison; Pig Iron for Castings; Ores Suitable for Bessemer Process; Purple Ores; Swedish Ores; Manganese and Iron; Sundry Analyses; Forms for Recording Results of Operations.

FOUNDRY PRACTICE

BALE, G. R. *Modern Iron Foundry Practice*. Part I., Foundry Equipment, Materials Used, and Processes Followed. 208 ill., 5¼ x 7½, 397 pp. **\$3.00**

HORNER, JOSEPH G. *Practical Iron Founding*. *Fourth Edition, Thoroughly Revised and Enlarged*. 283 ill., 5½ x 7½, 418 pp. **\$2.00**

CONTENTS: Sands and Their Preparations; Iron-Melting and Testing; Cupolas, Blasts and Ladles; The Shops and Their Equipments; Moulding Boxes and Tools; Shrinkage-Curving; Fracture-Faults; Principles of Green Sand Molding; Dry Sand Molding Cores; Loam Work; Elements of Machine Molding; Examples of Molding Machines; Machine Molded Gears; Miscellaneous Economies; Weights of Castings; Appendix.

McCRACKEN E. M., and SAMPSON, C. H. *Course in Pattern Making*. *In Press*

CONTENTS: General Information; Pattern Lumber; Hand Tools; Machines Used by the Pattern Maker; Moulding; Foundry Equipment; Patterns; Jaw for Steady Rest; Bearing Cap; Small Cylinder Patterns; Shaft Coupling; Bronze Bushing; Clutch Thimble; Core Box Plane; Gland; Wall Bracket; Compression

Chamber for Steam Pump; Rocker Arm; Boiler Flange; 1½-inch Return Bend; 6-inch Sheave Wheel; Piston; Piston Rings; Pulley and Gear Arms; Cylinder Head; Fly Wheel; 54-inch Sheave; Gears; Hollow Patterns; Skeleton Patterns, Loam Moulding; A Type of Pattern Construction; Additional Patterns.

PARSONS, S. J. *Malleable Cast Iron.* *Second Edition, Revised.* 86 ill., 6 x 9, 182 pp. *Reprinting*

CONTENTS: *Melting.* Analyses of Pig Irons; Crucible Furnace; Mixing; Care of Crucibles; Cupola; Air Furnace. *Moulding.* Facing Sands; Feeding; Gating; Spray Moulding; Oddside Moulding; Tube Moulding; Tub Moulding; Plate Moulding; Moulding a Cube, a Ring, Pipe, Pump Lever, Jawstock, Wheel, Elevator Bucket; Muffling; Core-making. *Annealing.* Construction of Ovens; Theories of Annealing; Annealing Ore; Treatment of Hard Castings; Packing; Charging; Building a Vault; Firing; Drawing; Re-annealing; Measurement of Temperature; American Process; Treatment of Special Castings; Annealing Pans. *Cleaning and Straightening.* Tumbling; Grinding; Causes of Distortion; Straightening Press; Straightening Wheels and Rings; Cylindrical Castings and Flanges; Irregular Shapes; Use of Wedges and Blocks; Setting Plate. *Design.* First Principles; Classification; Influence on Foundry Practice; Design of Wheels, etc. *Patterns.* Contraction; Machining Allowance; Cores; Metal Patterns; Core-boxes; Making a Spray; Setting Patterns on Plates. *Inspection and Testing.* Defects in Castings, Dirt, Scab, Cold Shuts, Sears, Blowholes; Mechanical Tests, Bending, Dropping, Drawing, Ringing; Defect Annealing; Good and Bad Tests; Shearing. *Foundry Chemistry.* Silicon; Sulphur; Phosphorus; Manganese; Carbon. *Mixing by Analysis.* Methods of Calculation. *Measurement of Temperature.* Construction and Use of Pyrometers; Installation. *Addendum.* Malleable Cast Steel.

PAYNE, DAVID W. *Founders' Manual.* A presentation of modern foundry operations, for the use of foundrymen, foremen, students and others. Ill., 4½ x 7½, 687 pp. **\$4.00**

CONTENTS: Elementary Mathematics; Weights and Measures; Natural Sines, Tangents, etc.; Materials; Mechanics; Alloys; Belting; Useful Information; Iron; Chemical Constituents of Cast Iron; Mixing Iron; Steel Scrap in Mixtures of Cast Iron; Test Bars; Chemical Analyses; Standard Specifications for Cast Iron Car Wheels; Standard Specifications for Locomotive Cylinders; Standard Specification for Cast Iron Pipe; Mechanical Analysis; Malleable Cast Iron; Steel Castings in the Foundry; Foundry Fuels; The Cupola; Moulding Sand; The Core Room and Appurtenances; The Moulding Room; Moulding Machines; Continuous Melting; Determination of Weight of Castings; Water, Lighting, Heating and Ventilation; Foundry Accounts; Pig Iron Directory.

A ready reference guide giving authoritative instructions for the solution of the many problems which are continually presented in the foundry. The information is gathered from many sources and presented in orderly fashion, so as to be of value for students as well as experienced men.

REISER, F. *Hardening and Tempering of Steel, in Theory and Practice.* Translated from the German of the third and enlarged edition, by Arthur Morris and Herbert Robson. 5 x 7¾, 130 pp. **\$2.50**

CONTENTS: Definition and Classification; Chemical and Physical Properties and Their Casual Connection; Classification According to Use; Testing for Quality; Hardening; Investigation of the Causes of Failure in Hardening; Regeneration of Steel Spoilt in the Furnace; Welding.

RICHARDS, WILLIAM A. *Forging of Iron and Steel.* A textbook for the use of students in colleges, secondary schools and the shop. 337 ill., 5½ x 8¼, 221 pp. **\$2.00**

(Author is instructor in forge, foundry and machine practice in the University High School and the University of Chicago, Chicago, Ill.)

CONTENTS: Introduction. Historic Use of Iron and Steel. Iron and Steel.

Equipment. Fuel and Fires. Drawing Down and Upsetting. Bending and Twisting. Splitting, Punching, and Riveting. The Uses of Blacksmiths' Tools. Welding. Electric, Autogenous and Thermit Welding. Brazing. Tool Steel. High Speed Tool Steel. Art Iron Work. Steam and Power Hammers. Calculations. Appendix.

A simple treatment of the subject for the use of high-school classes yet thorough and systematic enough to be a useful manual for the practicing smith. The work aims to elucidate the underlying principles of the subject and in a series of review questions that close each chapter brings out the important phases of the various processes discussed. In an appendix the author presents a set of exercises each of which exemplifies some principle of forge-work, thus giving the teacher an opportunity to map out a course in the subject best suited to the equipment of the school.

ROSE, J. *The Pattern Makers' Assistant.* Embracing lathe work, branch work, core work, sweep work and practical gear constructions, the preparation and use of tools. *Eleventh Edition.* 250 ill., $5\frac{1}{4} \times 8$, 334 pp. **\$2.50**

CONTENTS: Pattern Making; Lathes, Lathe Chucks and Lathe Tools; How a Pattern is Moulded; On Cores; Examples of Simple Lathe Work; Pipe and Joint Work; Wheels and Pulleys; Pipe Bends and Lagging; Globe Valves; Joints; Bench Work; Column Patterns; Thin Work; Sweep and Loam Work; Gear Wheels; Section Moulding; Machine Tools for Pattern Making; Tables.

ROXBURGH, WILLIAM. *General Foundry Practice.* Being a treatise on general iron founding, job loam practice, moulding and casting of finer metals, practical metallurgy in the foundry, and pattern-making from a moulder's point of view. 161 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 308 pp. (Van Nostrand's Westminster Series.) **\$2.50**

CONTENTS: GENERAL IRON FOUNDING. Starting a Small Iron Foundry Moulding Sands. Location of Impurities. Core Gum. Blow Holes. Burning Castings. Venting. The Use of the Riser in Casting. Chaplets. Shrinkage. Pressure of Molten Iron (Ferro-static Pressure). Feeding or the Compression of Metals. Metal Mixing. Temperature. Defects in Cast-iron Castings. Special Pipes (and Patterns). Green-sand and Dry-sand. Core Clipping. Machine and Snap-flask Moulding. Moulding Cylinders and Cylinder Cores. Jacketed Cylinders. Core Sands. Moulding a Corliss Cylinder in Dry-sand. General Pipe Core Making. Chilled Castings. Flasks or Moulding Boxes. Gates and Gating. Jobbing Loam Practice. Loam Moulding. Moulding a 36" Cylinder Liner. Moulding a Slide-valve Cylinder. Moulding a Cylinder Cover. Cores and Core Irons for a Slide-valve Cylinder. Moulding a Piston. Loam Moulding in Boxes or Casings. Moulding a 20" Locomotive Boiler Front Cross Block. The Use of Ashes and Dry-sand in Loam Moulding. MOULDING AND CASTING THE FINER METALS. Starting a Small Brass Foundry. Furnaces. Waste in Melting. Moulding. Temperature. Brass Mixtures, etc. Draw and Integral Shrinkage. Position of Casting and Cooling the Castings. Bronzes. Aluminium. Phosphor. Manganese, and Running with the Plug Gate. Casting Speculums. The Alloy. Draw. Treatment of Castings. Compression and Annealing. Melting and Pouring. Moulding Aluminium Founding. Scabbing. Sand. Gating. Risers. Melting, and Temperature. Aluminium Castings and Alloys. Malleable Cast. Practical Metallurgy in the Foundry. General Pattern-making from a Moulder's Point of View. Foundry Ovens and their Constructions. Fuels. Foundry Tools.

TREIBER, E. *Foundry Machinery.* Translated from the German by Charles Salter. 51 ill. $4\frac{3}{4} \times 7\frac{1}{2}$, 147 pp. **\$2.00**

CONTENTS: Machines for the Preparatory Treatment of Moulding Material; Moulding Machines; Hand Moulding Machines; Simple Lift-Up Machines; Turn-over Plate Machines; Moulding Presses; Jig Moulding Machines and Allied Types; Special Moulding Machines; Core Moulding Machines; Pneumatic Rammers; Fettling Machines; Hoisting and Conveying Appliances.

GOLD AND SILVER

BUSKETT, E. W. *Fire Assaying.* A practical treatise on the fire assaying of gold, silver and lead, including descriptions of the appliances used. 70 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 112 pp. **\$1.25**

CONTENTS: Sampling; Reagents and Fluxes; Assay of Acid Ores; Assay of Base Ores; Lead Assay; Bullion Assay; Methods of Handling Work; Laboratory Tests.

EISSLER, M. *Metallurgy of Gold.* A practical treatise on the metallurgical treatment of gold-bearing ores, including the processes of concentration and chlorination, and the assaying, melting and refining of gold. *Fifth Edition, Revised and Greatly Enlarged.* Over 300 illustrations and numerous folding plates. $6\frac{1}{4} \times 7\frac{1}{2}$, cloth. **\$9.00**

EISSLER, M. *Metallurgy of Silver.* A practical treatise on the amalgamation, roasting, and lixiviation of silver ores, including the assaying, melting, and refining of silver bullion. *Fifth Edition.* 150 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 376 pp. **\$4.00**

EISSLER, M. *Metallurgy of Argentiferous Lead.* A practical treatise on the smelting of silver-lead ores and the refining of lead bullion, including reports on various smelting establishments and descriptions of modern smelting furnaces and plants in Europe and America. 183 ill., $5\frac{1}{4} \times 7\frac{1}{2}$, 416 pp. **\$6.25**

COPPER, LEAD, ETC.

BENGOUGH, J. D. *Brass.* (Metallurgy Series.) *In Press*

FAIRIE, J. *Notes on Lead Ores.* Their distribution and properties. $4\frac{3}{4} \times 6\frac{1}{2}$, 64 pp. **\$0.50**

CONTENTS: Definitions; Properties; Occurrence; Galena; Cerussite; Minium; White and Red Leads; Pyromorphite; Mimetene; Wulfenite; Vanadinite; Plumbic Ochre; Anglesite; Caledonite; Linarite; Plumbo; Resinite; Cromfordite; Vanquelinite; Schééletine; Dekenite; Bleinierite; Boulangerite; Jamsonite; Zinkenite; Bournonite; Nussièreite; Miesite; Ores Containing Traces of Lead.

JONES, J. H. *The Tinplate Industry.* With special reference to its relation with the Iron and Steel Industries. A study in economic organization. $6 \times 8\frac{3}{4}$, 304 pp. **\$3.00**

CONTENTS: Early History; Method of Production; The Period of Monopoly; Transition Period; Effects of American Tariffs; Modern Organisation; Organisation of Labor; The Present and Future; Appendices.

LAMBERT, T. *Lead, and Its Compounds.* 40 ill., $5\frac{3}{4} \times 8\frac{3}{4}$, 226 pp. **\$3.50**

CONTENTS: History; Distribution; Composition of Lead; Dressing of Lead Ores; Smelting of Lead Ores; Condensation of Lead Fume; Desilverization; Lead Pipes and Sheets; Litharge and Massicot; Lead Poisoning; Lead Substitutes; Zinc and Its Compounds; Pumice-Stone; Drying Oils and Siccatives; Classification by Color of Mineral Pigments; Analysis of Raw and Finished Products.

PARRY, L. *Notes on Alloys.* 5½ x 7½, 60 pp. **\$3.50**

CONTENTS: Introduction; General Information About Metals and Alloys; Classification and Tabulation of Alloys; Analysis of Alloys; The Systematic Treatment of Metalliferous Waste.

PARRY, L. *Systematic Treatment of Metalliferous Waste.* 5½ x 8½, 121 pp. **\$2.50**

CONTENTS: Sources of Supply; Kind of Waste; General Chemical and Metallurgical Principles; Partial or Semi-Refining; Smelting Lead Ashes and Cleaning Tin Slags; Smelting Tin Ashes and Solder Ashes; Smelting Antimonial Material; Separation of Copper from Tin, Lead and Antimony; Copper Work; Miscellaneous; Metal Working and Refining.

PARRY, L. *Analysis of Ashes and Alloys.* 5½ x 8½, 143 pp. **\$2.50**

CONTENTS: Determination of the Individual Elements; Analysis of Ashes, etc.; Summary of Miscellaneous Analyses; Miscellaneous Tables and Data.

SEXTON, A. H. *Alloys (Non-Ferrous).* 137 ill., 5¾ x 8¾, 300 pp. **\$3.50**

CONTENTS: Properties of Alloys as Related to Those of Their Constituents; Phenomena of Solidification; What the Microscope Can Teach; Changes in the Structure of Alloys in the Solid Condition; Metals Used in the Preparation of Alloys; The Brasses; The Bronzes; Machinery Brasses and Bronzes; White Alloys; White Anti-Friction Alloys; Light Alloys; Fusible Alloys; Nickel Alloys; Alloys of the Precious Metals; Preparation of Alloys.

GRINDING

HAENIG, A. *Emery and the Emery Industry.* A technical study of modern abrasives and the development of the modern grinding-machine industry. Translated by C. Salter. 45 ill., 5¼ x 7½, 114 pp. **\$2.50**

CONTENTS: ABRASIVE MATERIALS. *Natural Abrasive Materials.* Emery Corundum. *The Artificial Abrasives:* Carborundum, Acheron's Carborundum Furnace Equipment and Operation of Carborundum Works, Purification and Properties of Carborundum, Output of Carborundum. Artificial Corundum. Crushed Steel. Electrite. EMERY AND GRINDING DISCS: *The Preparation of Discs and Emery Wheels.* The Binding Medium. Hardness and Grain. Peripheral Velocity. Hardness of the Abrasive Material. The Manufacture of Emery Discs, etc. Varieties and Shapes of Emery Discs. Wheels and Cylinders. Experiments on the Stability and Capacity of Emery Wheels. Points on the Use of Grinding Discs. *The Further Treatment of Grinding Discs:* Mounting the Discs. Guards. Results of Bursting Tests. Dust Exhauster. Roughing and Trueing the Grinding Discs. GRINDING MACHINES. *Introductory: Principal Types of Grinding Machines.* Tool-Grinding Machines. Knife-Grinding Machines. Saw-Sharpening Machines. Machines for Grinding Flat Surfaces. Special Types of Grinding Machines. *Circular Grinding, Universal Tool Grinding Machines; Working Results Obtained in Practical Grinding.* Literary Sources Consulted.

CORKWOOD

STECHER, GILBERT E. *Cork.* Its Origin and Industrial Uses. Ill., 5½ x 8½, 94 pp. **\$1.00**

CONTENTS: Quercus Suber (Cork); Quercus Liber (Linnaeus); Cork; Origin, Including the Territory of Growth and Attempts to Transplant the Seed; The Tree and Growth; Diseases; Stripping; Botany and Chemistry, Including Compression Diagram; Uses and Application; Substitutes; Manufacture; Raw Stock,

Sorting, Stopper Making, Cork Disc Making, Waste Utilization; Extent of the Manufacturing Industry.

A concise, plain story of the corkwood stopper about which there seems to be no written information extant. In the discussion of the origin of cork the author details the territory in which corkwood grows and explains the various attempts that have been made to transplant the seed. The tree, its growth and diseases are explained, and the uses, application and substitutes for the corkwood are taken up in detail. The methods of manufacture and the utilization of waste receive generous treatment.

ARCHITECTURE AND BUILDING

(See also Drawing.)

MITCHELL, C. F. and G. A. Building Construction and Drawing. A textbook on the principles and details of modern construction. Elementary Course. *Eighth Edition, Revised and Enlarged.* 1100 ill., $5\frac{1}{4} \times 7\frac{1}{4}$, 482 pp. **\$2.00**

CONTENTS: Instructions for Beginners. Brickwork. Masonry. Girders. Joints in Carpentry. Floors. Partitions. Wood, Composite, Iron and Steel Roofs. Joinery. Plumbing. Slating and Tiling. Building Quantities and Memoranda. Exercises. Board of Education Syllabus. Examination Papers of the Board of Education.

MITCHELL, C. F. and G. A. Building Construction. A textbook on the principles and details of modern construction for the use of students and practical men. Advanced Course. *Seventh Edition, Thoroughly Revised and Much Enlarged.* 800 ill., $5\frac{1}{2} \times 7\frac{1}{4}$, 949 pp. **\$3.00**

CONTENTS: Limes and Cements. Concrete. Asphalt. Plastering. Stones Bricks, Tiles. Terra-Cotta and Stoneware. Iron and Steel. Timber. Paints and Varnishes. Glass. Foundations. Brickwork. Flues. Fireplaces and Tall Chimneys. Masonry. Carpentry. Half-Timbered Work. Pillars. Columns and Stanchions. Graphic Statics. Girders. Fire-Resisting Construction. Reinforced or Ferro-Concrete. Roofs and Roof Covering. Joinery. Stairs and Handrails. Sanitation. Water Supply. Hot Water Apparatus and Ventilation. Electric Bells and Lighting. Exercises. Appendix and Examination Tables.

The previous editions of both of these works have enjoyed great popularity. These new editions are entirely revised, being brought up to date, to correspond with the requirements of the various British boards, institutes and commissions having supervision over building work.

RENEWICK, W. G. Marble and Marble Working. A handbook for architects, sculptors, marble quarry owners and workers and all engaged in the building and decorative industries. 72 ill., 13 colored plates, $6 \times 9\frac{1}{2}$, 250 pp. *Reprinting*

CONTENTS: Introductory. The Chemistry of Marble. Its Geological Formation. A Short Classification of Marbles. Antiquity of the Marble Industry. Ancient Quarries and Methods of Working. Modern Quarries and Quarrying Methods. Machinery Used in Quarrying. European and American Systems Compared. Marble as Building Material. Uses of Marble (other than for Building Purposes). Sources of Production: Italian, French and Belgian, Greek, United Kingdom and British Colonies, and other Marbles. Continental Marble Working. Marble Working Machinery. Marble Working in the United States. American Machinery Described and Compared. Marble Working: A British Industry. Marble Substitutes and Imitations. Practical Points for the Consideration of Architects. Hints on the Selection of Marble. List of Marbles in Ordinary Use, with Descriptive Notes and Instances of Their Application.

ROBINSON, J. B. Architectural Composition. An attempt to order and phrase ideas which hitherto have been only felt by the instinctive taste

of designers. *Second Edition.* 173 ill., $6\frac{1}{4} \times 8\frac{3}{4}$, 233 pp. **\$2.50**

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SOUSTER, ERNEST G. W. *The Design of Factory and Industrial Buildings*

With chapters on welfare work and industrial research departments. 98 ill., $5\frac{1}{2} \times 8\frac{1}{2}$, 166 pp. **\$4.00**

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PAINTING AND PAPERHANGING

BROWN, W. N. *Workshop Wrinkles for Decorators, Painters, Paper-Hangers and Others.* *Second Edition.* $5 \times 7\frac{1}{2}$, 142 pp. **\$1.00**

Useful hints, recipes and other information arranged alphabetically under Decorating, Painting, Paperhanging and Miscellaneous.

BROWN, W. N. *House Decorating and Painting.* 88 ill., $5 \times 7\frac{1}{2}$, 150 pp. **\$2.00**

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DESAINT, A. *Three Hundred Shades and How to Mix Them.* For decorators, painters and architects. 100 plates, 12×7 . **\$9.00**

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JENNINGS, ARTHUR S. *Commercial Paints and Painting.* A handbook for architects, engineers, property owners, painters and decorators, etc. $5\frac{3}{4} \times 8\frac{1}{2}$, 236 pp. (Van Nostrand's Westminster Series.) **\$2.50**

CONTENTS: Object of Painting; Durability of Paint; Cost of Cheap and Superior Paints Compared; Cost of Keeping Property Painted; Specifying Paints; The Materials Used in Painting; Conditions which Determine the Economic Value of the Paint; Simple Tests for Painters' Materials; The Paint Most Suitable for Different Surfaces; How Paint and Varnish Should be Applied; Paint and Color Mixing; Tools and Plant; Defects in Painters' Work; Specifications for Painters' and Decorators' Work; Painting by Mechanical Means.

Answers the question: How may a thoroughly durable job of painting, in its many and varied applications, be done at a minimum cost consistent with good material and good workmanship? Explains the application of paints, varnishes, etc., at sufficient length to enable the engineer and architect to specify accurately. The principal materials that enter into commercial painting are described in detail and the various surfaces, wood, iron, cement, etc., are separately dealt with, and suitable paints or protective materials carefully pointed out. The chapter on paint spraying and paint dipping is based on observations of the various processes in actual use in large manufacturing establishments.

INDUSTRIAL TRADES

BATEY, JOHN. The Science of Works Management. $4\frac{3}{4} \times 7\frac{1}{2}$, 232 pp. \$2.00

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GILBRETH, FRANK B. Primer of Scientific Management. With an introduction by Louis D. Brandeis. 5×8 , 116 pp. \$1.00

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GILBRETH, FRANK B. Motion Study. A method for increasing the efficiency of the workman. With an introduction by Robert Thurston Kent. 44 ill., $5\frac{1}{2} \times 8$, 139 pp. \$2.00

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A presidential address to the Junior Institution of Engineers, in which the author points out the relation of the engineer to industries, calling attention to the needs of intensive work now and its especial needs after the war is over and reconstruction commences.

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PATENTS

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EDELMAN, PHILIP E. Inventions and Patents. Ill., 5¼ x 8¼, 300 pp. **\$1.50**

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A broad general exposition, in simple terms, of the procedure in the patent office and of the possibilities in patented inventions. Contains much information valuable to inventors, investors and manufacturers.

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Inspiring, suggestive, and full of practical working directions. An appendix is given with many practical suggestions for work; many of the leading needs of today are set forth by eminent authorities.

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SWAN, K. R. *The Law and Commercial Usage of Patents, Designs and Trade Marks.* (Westminster Series.) $6 \times 8\frac{1}{2}$, 402 pp. **\$2.00**

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THOMPSON, W. P. *Handbook of Patent Law of All Countries.* *Special Edition, Completely Revised.* $4\frac{1}{4} \times 6\frac{1}{2}$, 263 pp. **\$1.50**

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ADAM, P. *Practical Bookbinding.* Translated from the German by Thos. E. Maw. 127 ill., $5\frac{1}{2} \times 7\frac{1}{2}$, 191 pp. **\$2.50**

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WATCH MAKING AND JEWELRY

GOODCHILD, W. *Precious Stones.* With a chapter on Artificial Stones by R. Dykes. 42 ill., $6 \times 8\frac{1}{2}$, 319 pp. (Van Nostrand's Westminster Series.) **\$2.50**

CONTENTS: Introduction; Modes of Origin; Physical Properties of Gem Stones; Cutting of Gems; Imitation Gems and the Artificial Production of Precious Stones; Diamond; Fluor Spar; Opal; Corundum; Spinel and Chrysoberyl; Calcite; Labradorite; Beryl; Garnet; Olivine; Sphene; Apatite; Jet; Glossary.

JOCKIN, WILLIAM. *Arithmetic of the Gold and Silversmith.* Prepared for the use of jewelers, founders, merchants, etc., especially for those engaged in the conversion and alloying of gold or other metals, the mixing of various substances, etc. With numerous examples. $5 \times 7\frac{1}{2}$, cloth, 62 pp. **\$1.00**

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RATHBONE, R. L. B. *Simple Jewelry.* A practical handbook dealing with certain elementary methods of design and construction. Written for the use of craftsmen, designers, students and teachers. 94 ill., $5\frac{3}{4} \times 8\frac{1}{2}$, 294 pp. **\$2.50**

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ROSE, T. KIRKE. *The Precious Metals.* Comprising gold, silver and platinum. 46 ill., 6 x 8½, 311 pp. (Van Nostrand's Westminster Series.)
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Sets forth in the simplest and most explicit way a method of making and finishing pottery which may be followed by the most inexperienced individual workers, not in an empirical way but upon a sound, scientific basis, so that with the knowledge imparted the student has at his disposal the whole range of ceramic science.

HAINBACH, R. *Pottery Decorating.* A description of all the processes for decorating pottery and porcelain. Trans. by C. Salter. 22 ill., 6½ x 9½, 250 pp.
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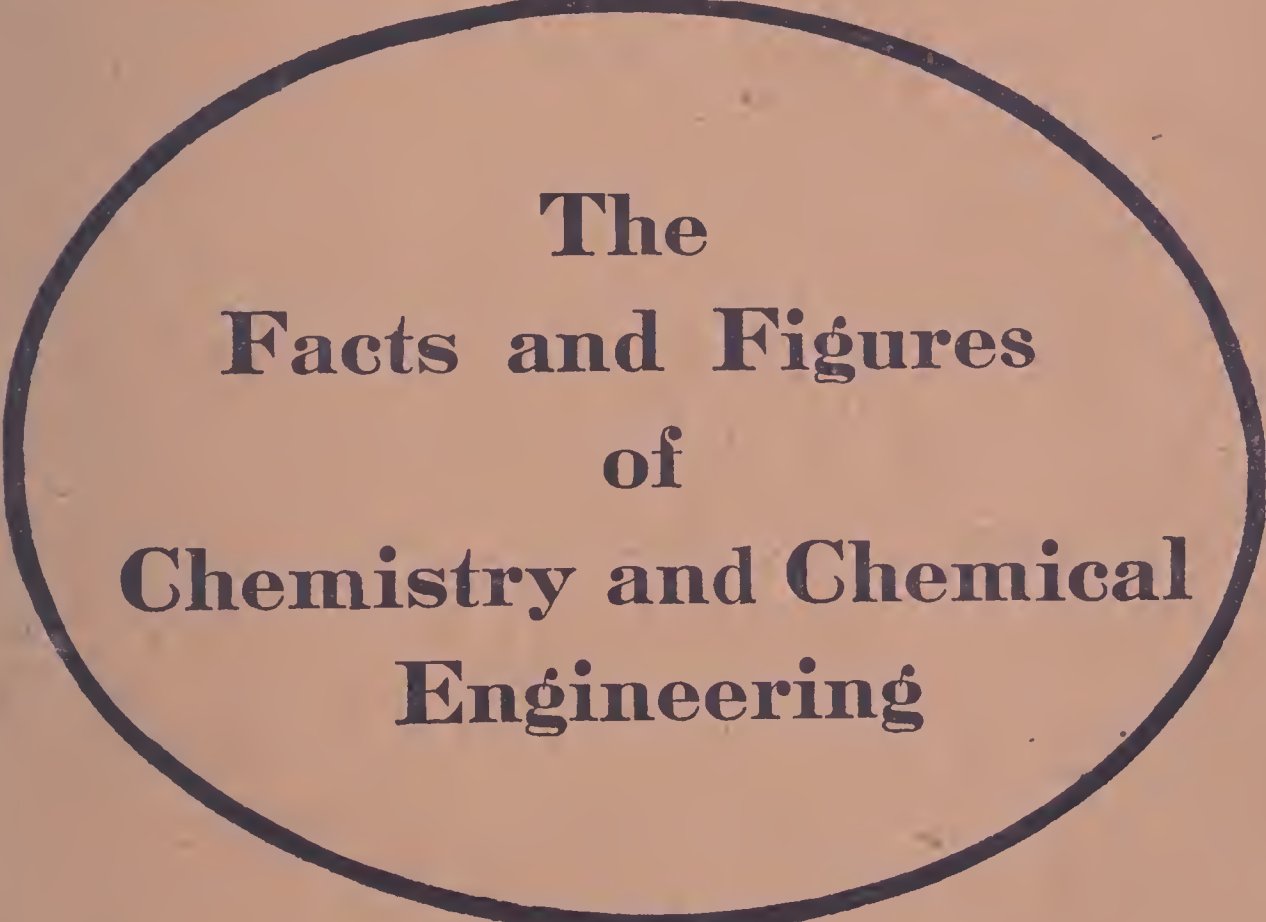
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For Analytical, Manufacturing and Investigating Chemists and Chemical Students

EDITED BY

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